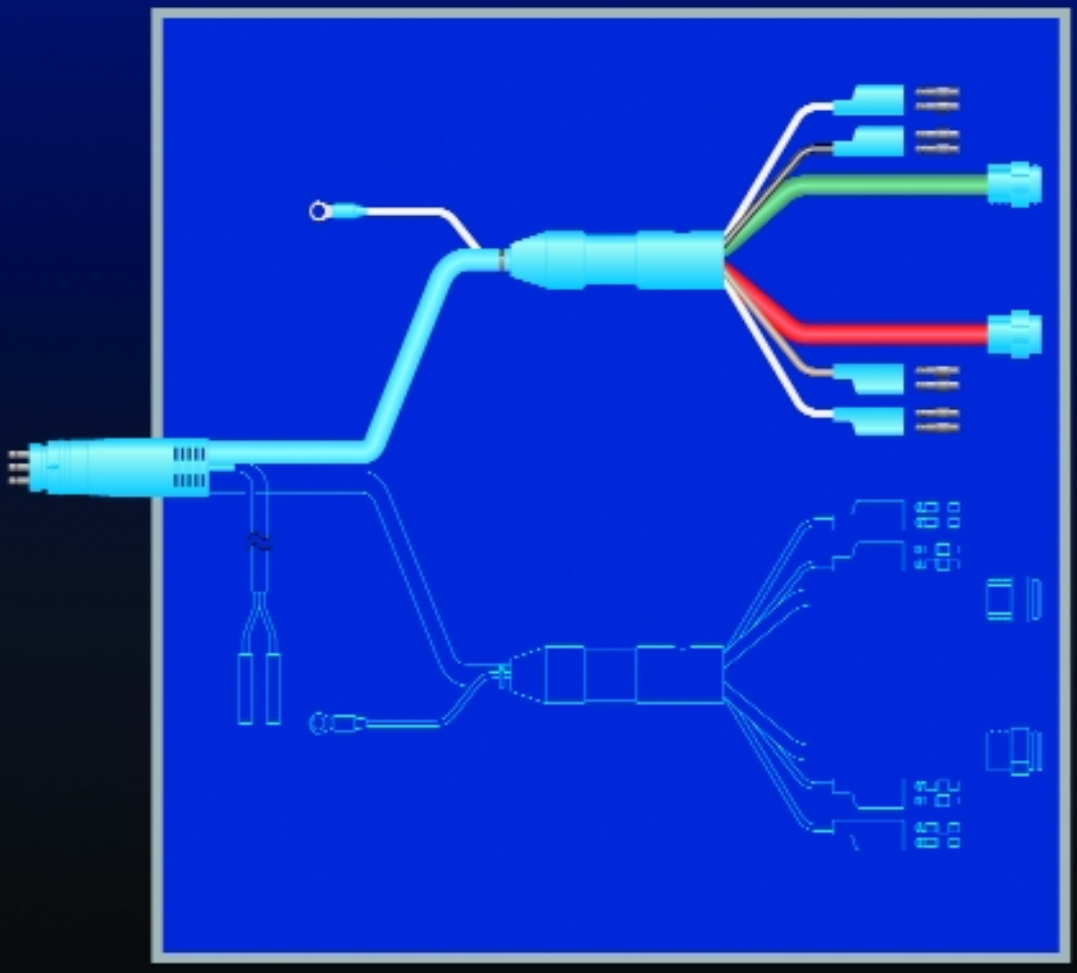
$15.00

Grote®

The first name in vehicle safety systems®

# ULTRA BLUE SEAL®

## WIRING HARNESS HANDBOOK

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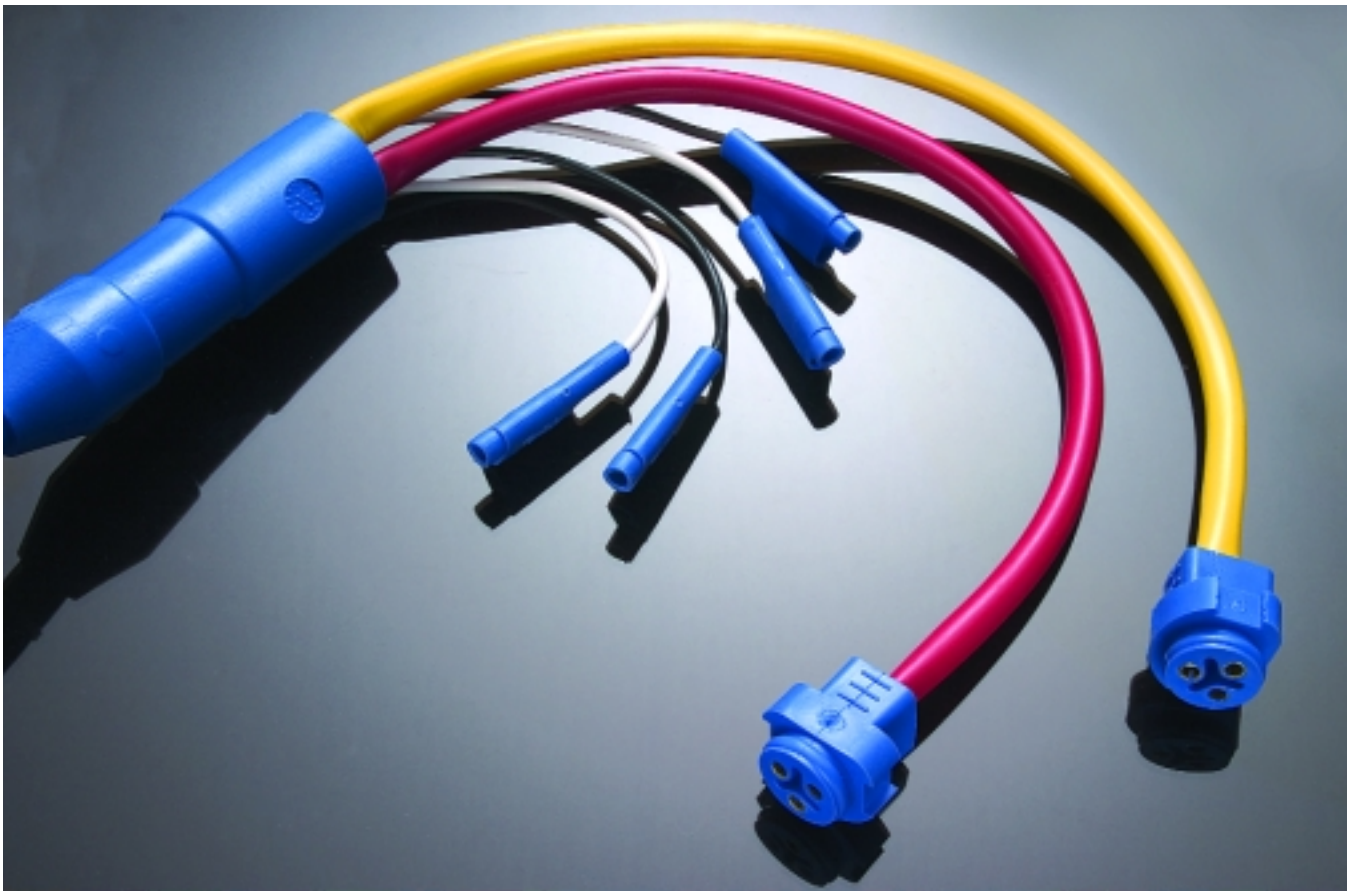
# Ultra-Blue Seal® System

## *The Modular Plug & Go Connection System from Grote*



### *Modular Design*

The UBS system provides true “Plug & Go” modular convenience and reliability for trailer electrical installations. It’s designed around a family of standardized components that plug together to form complete lighting and wiring systems. UBS components can be used to create systems for most styles and sizes of trailers including dry vans, tankers, reefers, flat beds and special task trailers such as container chassis.

The modular design means that all UBS components provide positive connectivity no matter what the design function and position on the trailer requires. Grote engineers design our lamps to fit our plugs and our plugs to work with our lamps.

### *Interchangeability*

The modular design also means that the components can be changed without requiring cutting and splicing into the harness system. If for instance a jumper is damaged, it can be changed with a new, replacement part without the need for trimming to length, crimping or soldering.

### *Double Seal Technology*

At the heart of the UBS system is the patented Grote Double Seal feature. It provides double protection from moisture and contaminants. The Double Seal effect results from a molded-in circular ring in the connector, which corresponds to a mating ring on the lamp.

The inner sealing ring covers the terminal area and outer ring, or dust skirt, seals around the outside area of the lamp plug connection. The Double Seal drastically decreases water intrusion and corrosion.

Another UBS advantage is the Grease Groove design on the male-pin plugs. Dielectric grease added to female terminals and male terminals to

*Exclusive locking collar prevents accidental disconnects and provides a means of securing the connection to the trailer*

protect against moisture and contaminants sometimes causes a hydraulic effect when the lamp and plug are connected. This hydraulic effect can prevent the plug from being fully seated in the lamp, creating a potential leak path. Grease Grooves allow the sealing compound to disperse around the terminals with the excess sealant escaping into the reservoir, eliminating the hydraulic effect.

## Durability

Every UBS component is designed to connect securely and provide a strong, moisture tight seal. Each plug is manufactured to precise tolerances that enable the UBS system to meet or exceed trailer industry standards.

Internal wire-to-wire connections are sonic welded for a strong, efficient and reliable connection.

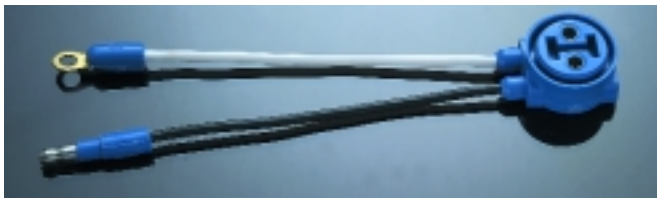
UBS plugs designed for Grote male pin lamps use banded female terminals. Banded terminals ensure that a solid electrical contact is created and maintained each time a connection is made. The bands provide a spring-like effect to the female terminals in addition to ensuring an excellent electrical connection. Banded terminals are also used in UBS nosebox plugs to maintain a secure fit.

Grote's signature blue overmolding encapsulates the connections providing critical strain relief and they are virtually impervious moisture barrier.

Unique to Grote's UBS system is the locking collar used between the main & rear sill connection. The rear sill collar locks the main harness to the rear sill harness to avoid vibration and wear. Another feature is the grease fitting which allows dielectric grease to be applied to the connection.

## Proven Reliability

Certified test results show the UBS system out-performed competitive products in a tough saltwater immersion and vibration testing environment. Grote products went head-to-head with the competition and had far fewer failures than any challenger. As a complete system, the LED's and UBS system produced the highest pass rate, lasting 39% longer than the closest competitor. 100% of the Grote LED's were functioning at the end of the test.



*UBS offers a fully integrated, modular wiring and lighting system.*

## Continuous Development

Grote continues to develop the UBS system to meet the needs of those who demand the best.

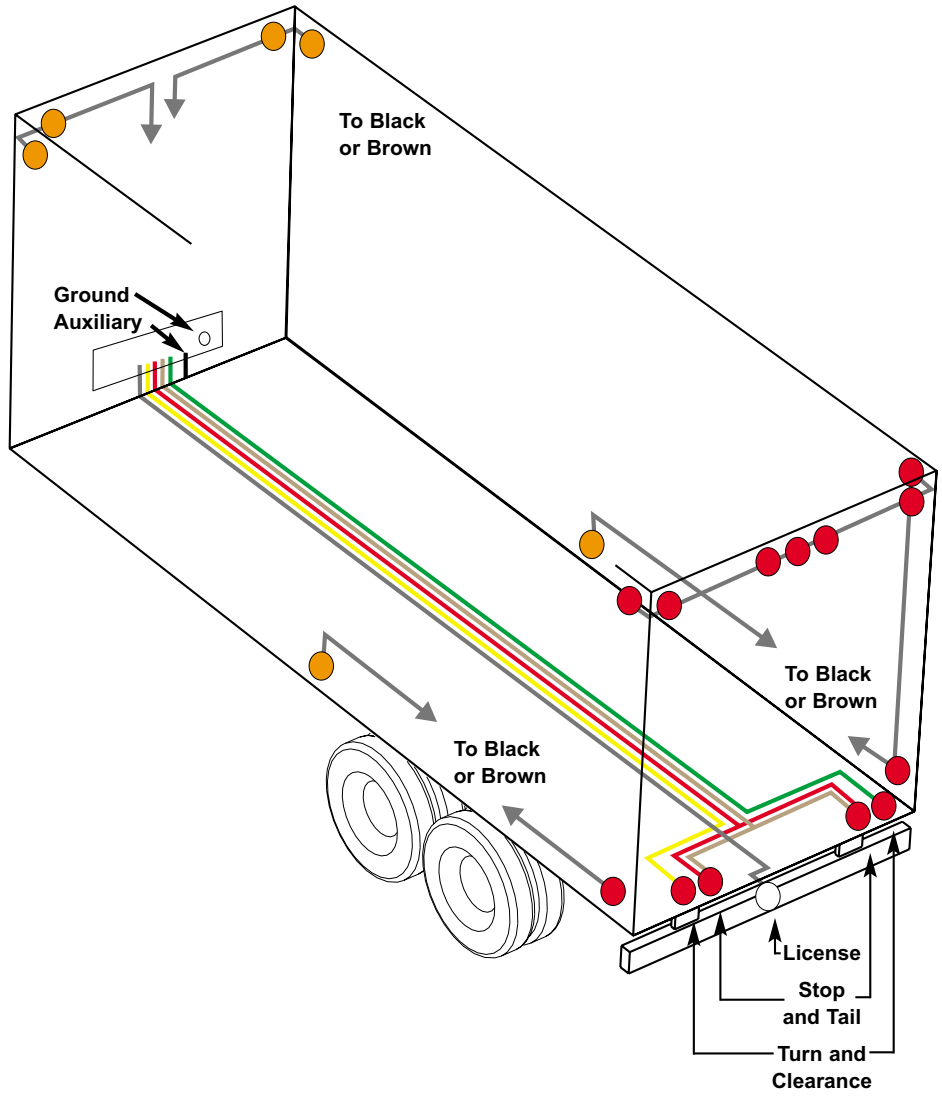
Our male pin and double seal technology is carried over into our newest designs resulting in a single harness system that can be used for either incandescent or LED lighting packages. Plugs for incandescent, or LEDs offer simpler electrical maintenance management; fewer SKU's in inventory and an optimized trailer lighting system.

*Sonic welded connections and precision overmolding provide strong, moisture tight seals*

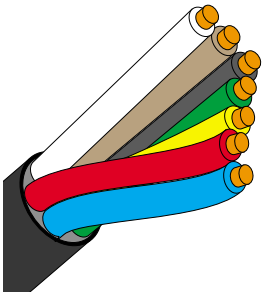
*Center grease reservoir protects against hydraulic pressure forcing connection open.*

*Patented double seal design adds double protection against moisture and contaminants.*

# Grote Wire Harness Configuration

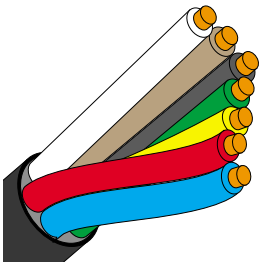



## 7-Conductor Cable: (SAE J1067 and J560)



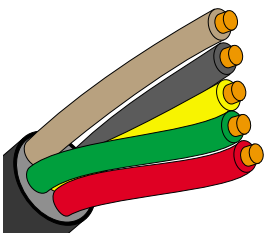
**White** Ground (10 ga.)
**Brown** Tail and license lamp, and clearance lamps (12 ga.)
**Black** Clearance, sidemarker, and identification lamps (12 ga.)
**Yellow** Left turn signal lamp (12 ga.)
**Green** Right turn signal lamp (12 ga.)
**Red** Stop lamps (12 ga.)
**Blue** Auxiliary circuit (12 ga.)

## Heavy Duty 7-Conductor Cable System: (SAE J1067 and J560)



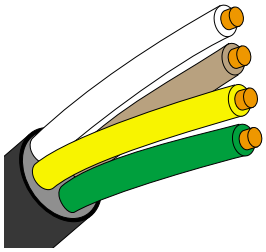
**White** Ground (8 ga.)
**Brown** Tail and license lamp, and clearance lamps (12 ga.)
**Black** Clearance, sidemarker, and identification lamps (12 ga.)
**Yellow** Left turn signal lamp (12 ga.)
**Green** Right turn signal lamp (12 ga.)
**Red** Stop lamps (10 ga.)
**Blue** Auxiliary circuit (10 ga.)

## 5-Conductor Cable:
**(chassis ground and without auxiliary circuit)**



**Brown** Tail and license lamp, and clearance lamps
**Black** Clearance, sidemarker, and identification lamps
**Yellow** Left turn signal lamp
**Green** Right turn signal lamp
**Red** Stop lamps

## 4-Conductor Cable: (boat trailer harness)



**White** Ground
**Brown** Tail and license lamp, and sidemarker lamps
**Yellow** Left turn signal lamp and stop lamp
**Green** Right turn signal lamp and stop lamp

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## *Getting Started With UBS Blue PowerSets*

Always make certain that you have an accurate set of dimensions before starting to specify the UBS components. Accuracy is required to assure a quality installation with enough wire to reach without strain and not so much that the excess makes installation sloppy and prone to damage. Take care to note any situations that might effect the system installation such as the presence of under-carriage sliders and lift gates for example.

Use the Grote catalog to determine the type and quantity of lights you require. The UBS System is a perfect complement to our tough, long-life SuperNova® LEDs line. Always refer to The Federal Motor Vehicle Safety Standard (FMVSS) 108 for regulations and requirements governing the required number and proper position of the lamps on the trailer.

As you start this section, it's important to determine the ground method you plan to use. The recommended Plug & Go components in this section are based upon ground return design. See *Tips and Troubleshooting* section.

# Ultra-Blue Seal® System Design Guide

This Guide provides you with exclusive Grote design and information tools to help create the optimal power harness system for every trailer application.

**Section I** (page 7) features standard designs called Grote Blue PowerSet Systems for typical trailers and trailer variations in each trailer category. For example, there's a Blue PowerSet system for the Dry Van category, which includes recommended systems designed by trailer lengths up to fifty-three feet long.

Each featured trailer type is illustrated with a diagram that shows the preferred UBS routing and connecting points. Along with that, there is a set of component specification charts that indicate the recommended Grote product for each specific application. Alternatives to the recommended choice are listed as well, for use in situations where there are variations to the trailer size and configuration that require a deviation from the stock design.

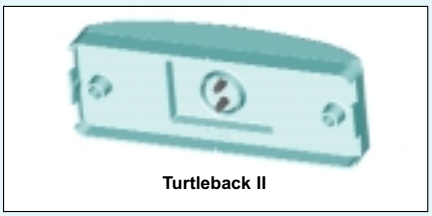
This section also contains worksheets for laying out your own custom designed systems. Worksheets are set up with diagrams of trailers without the wiring. The system specifier then lays out the wiring and adds part numbers to complete the worksheet. Completed worksheets can be used for quoting, ordering and as a shop installation guide.

**Section II** (page 37) is the catalog of Grote UBS components. This listing provides a quick visual reference along with a complete set of specifications (including dimensions and application information). This catalog section offers a quick visual reference for parts listed in section one.

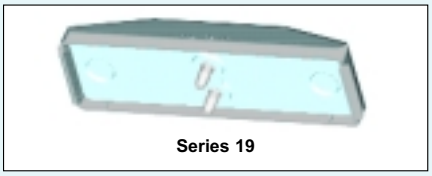
**Section III** (page 46) contains tips on installing UBS Systems. It's a perfect guide to faster, easier and more efficient installations. The tips cover routing and securing wiring, and what to avoid when installing the UBS System.

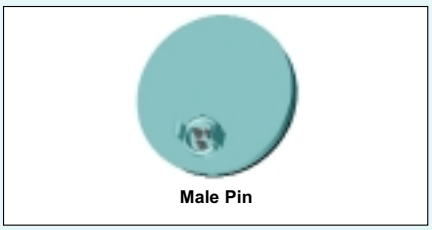
## *Light Grid*

10/14/15/30 Marker Lamp

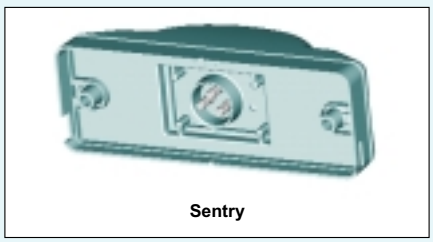

Turtleback II

Thin Line LED


Series 19


Male Pin

Female pin


Sentry

# Using this Guide

This guide is intended to help end users pick an electrical system that best fits their application, while maintaining legal lighting requirements.

Before starting, review the Grote Know How book, *Basics of Electricity* to get a general understanding of current flow, proper wire gauging and system grounding.

Use the Grote catalogs to determine the lights and their locations required for your trailer.

Match their termination with the proper harness and pigtail connections. Note that Grote UBS plugs are designed to be interchangeable between LED and incandescent lighting of the same series. Always refer to the Federal Regulations and requirements in this guide for proper lamp position, quantity and color. Determine the length of the trailer and note any other characteristics that could effect wire installation, (examples: sliders and lift gates).

Determine if your method for grounding will be return ground or chassis ground. Refer to section on grounding in installation tips section of the Guide.

## Specifying your System

Determine your type of trailer and refer to that section of the UBS Wire Harness Design Guide. In each case, Grote has designed optimal systems for various types of trailers. The systems are designed to be ground return with limited use of pigtails.

In each design we have highlighted the required harness to equip that particular trailer. Because of the variety of designs and features, modification may be necessary for some applications. Also, end users may prefer to use different lamps or route wires in a different manner, in which case, we provide options. Along with the recommended harness we offer various lengths and plug configurations. Additional options for rear sills, main harnesses and jumper harnesses can be found in corresponding sections of this guide if the recommended one will not meet the end user's design requirements.

Use the illustrations provided in the layouts to see how connections are made and where.

### Step One:

Determine trailer length, routing of cables and wires and lamps and their locations. Now refer to the section of this guide that represents your trailer length and type.

### Step Two:

Identify the harnesses needed for the "floor" of the trailer, which would include the main or mains and the rear sill.

**Main harness:** Grote offers both molded #10 ring terminals and molded push-on 0.180 female nose box plugs for connection to the nose box or front receptacle. Note that on a 28 foot trailer, Grote recommends using a parallel main that connects the front receptacle to the rear receptacle without any interruption. For a 48 foot to 53 foot trailer, Grote offers the option for connection to the mid-turn lamps from the main harness. The connection for the ABS unit is also incorporated into the main harness.

*Note: Additional main harnesses can be found on pages 37 and 38 of this guide.*

**Rear sill harness:** For this harness Grote has provided two options. The first relates to the actual installation of the harness, in that the rear sill is offset to the roadside of the trailer or routed down the middle. On the offset version, the curbside leg is lengthened to route across the rear of the trailer to the lamps. The second option relates to the choice of lamps, which may be female pin or male pin. The drop off of the front of the rear sill is still the connection for the ABS

fault lamp. Lengths correspond with the style of rear sill. However, the slim line female connections at the end allow you to add an extension if the length is too short.

*Note: The male pin lamp plug will fit both incandescent and LED lamps. Also, additional information and options for rear sills can be found on page 39.*

### Step Three:

Identify the harnesses needed for the front marker lamps. The type of lamp and style will determine your harness requirements.

*Example of type: If using a single lamp on each front corner, you will require a lamp that is PC rated.*

**Front clearance harness:** For this harness Grote has provided the end user several options in both power connections and lamp styles.

First determine the routing of the harness and the length you will need from your power connection to the lamp(s). Power connections offered in this catalog are either ring terminal or slimline 0.180 male bullets that plug into provided drops on the main harness. (Note: the ring terminals are overmolded for protection).

For the front marker there are two lamp connection options. The first option is a PL-10 plug that plugs directly into the lamp. The second two options both utilize 0.180 slimline female connections for various lamp pigtails.

*Note: The flow through version accommodates two lamps per corner, (P2 rating). Also, roadside and curbside lengths are different to accommodate offset nosebox receptacles.*

### Step Four:

As we move to the rear of the trailer, we identify the harnesses required for the rear marker and license lamps. Using the straight through rear sills allows for direct connections into the system using 0.180 slim line male and female connections.

**Rear marker harness:** Four harness options have been provided for this application. All harnesses options are two feet in length and connect to the provided drops on the rear sill. The first three harnesses have lamp connections that plug directly into the lamp. The fourth harness provides the end user with the option for a pigtail, with slim line 0.180 connections.

**ABS fault lamp harness:** Grote has offered two different lengths for this harness based on rear sill application, (center or offset).

The offered plug options are the PL-10 and the slim line 0.180 female for pigtail application.

This harness is to be plugged into the drop from the 7-way plug on the rear sill if the length on the rear sill is not long enough to reach ABS fault lamp.

*Note: This harness may not be required if drop from rear sill will reach lamp.*

**License lamp harness:** Three harness configurations offer accessibility for any lamp style. The option with the slim line 0.180 females will connect to any standard license lamp pigtail. This harness is designed to plug into the straight through rear sill, as are the other rear marker lamp harnesses.

**Rear identification harness, (3 lamp)** For this harness, Grote has provided numerous options based on length and lamp design. The two lengths shown are designed for trailers where the identification lights are on the lower frame, (36” dimension), and in the upper rail, (120” dimension). The 36” length can also be used with a jumper harness for upper rail application. Both styles offered plug directly into the straight through rear sill with slim line 0.180 terminations.

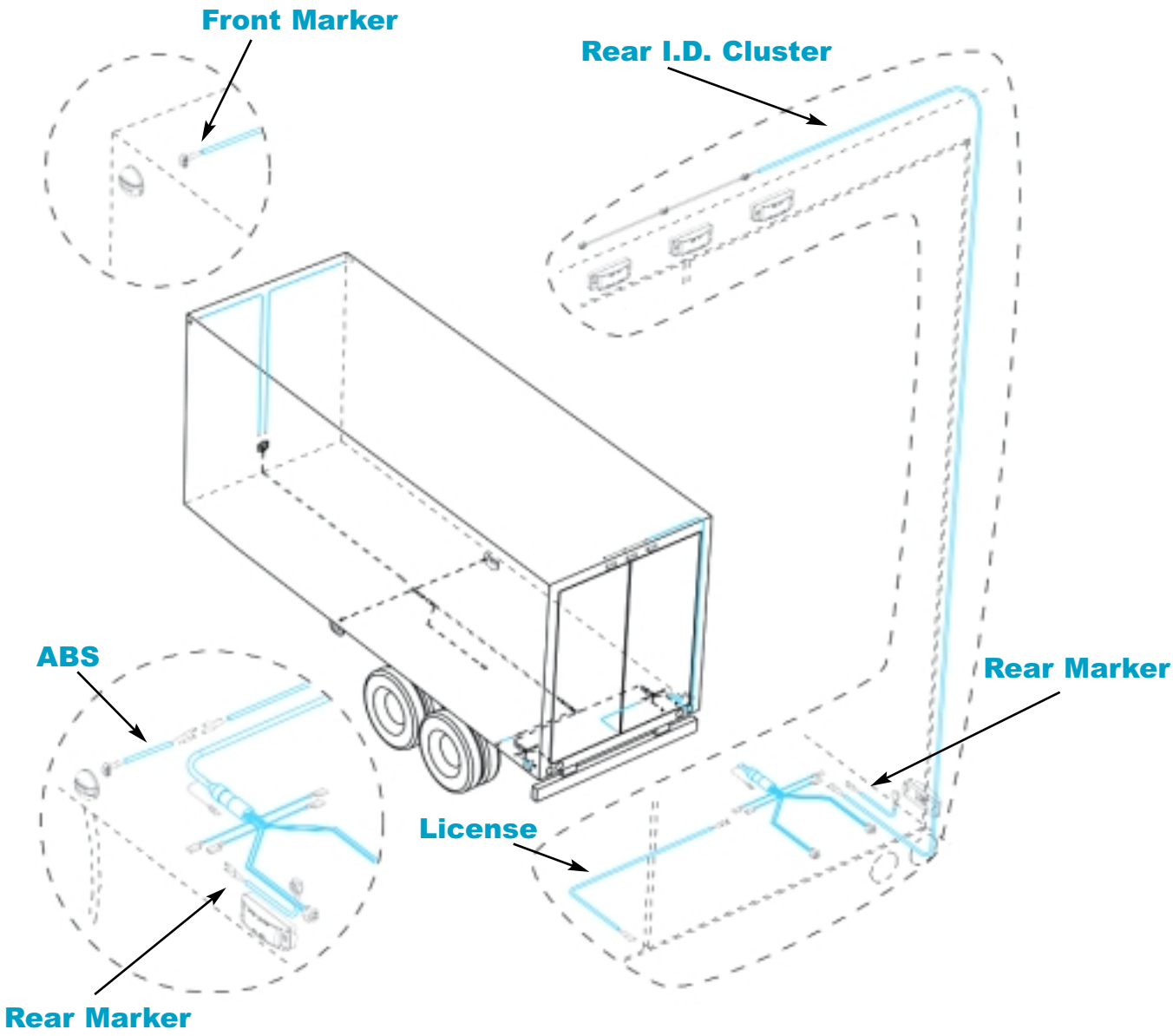
Three lamp options have been provided, and a fourth option for pigtails has also been listed. The lamp options are the Turtleback II, the Marker lamp plug and the Thin-line LED.

*Note: the 3” LED lamp can also be used with the Thin-line lamp plug.*
*Note: Legal lamp spacing is 6” to 12” centers.*

Again, this reference guide is designed to step you through the process of identifying your harness system. Grote has laid out a standard design to met legal lighting requirements. It’s understood that this application may not work for every trailer application, but this design can be used as a starting point.

Additional harnesses and marker lamps can be connected to the UBS system without the need for splicing or cutting of wires.

## Marker Lamp Options for “Straight Through” Rear Sills



# UBS Molded Plugs Commonly Used In Trailer Harness Applications

### Marker Lamp Plug

- Fits lamp series 4522, 4523, 4581, 4708, 4710, 4711, 4712, 4720, 4721, 4722, 4723, 4733, 4737, 4742, 4750, 7843, and U.S. 10, 14, 15 and 30 lamps
- Double Seal
- Available for flow-through applications (multiple lamps)

### Turtleback II

- Fits lamp series 4680, 4683, 4684, 4686, 4687 4707 and 7836
- Double seal
- Grease slot
- Available for flow-through applications (multiple lamps)

### Thin Line 3" LED

- Fits lamp series 4690, 4692, 4693, 4513, 4510, 4734, 4724, 4736 and 7845
- Double Seal
- Grease Slot
- Available for flow-through applications (multiple lamps)

### Straight-In LED

- Fits same lamps as thinline 3” plug.
- Pigtail application only.
- Fits and seals 5/8” diameter hole.

### Series 19

- Fits lamp series 4674, 4749 and 7839 clearance/marker lamps and 4709, 6029/6030 license and utility lamps
- Designed to fit mounting bracket
- Available for flow-through applications (multiple lamps)

### Straight Male Pin

Straight-in for male-pin lamp connectors.

- Double Seal
- Grease Slot

### 90° Male Pin

90° connector for connecting to male-pin lamp connectors. Used in areas where space is limited.

- Double Seal
- Grease Slot

### Female Pin

Designed for standard 3-way female pin lamp connectors.

### 2-Way Sentry

### 3-Way Sentry

### Standard Male

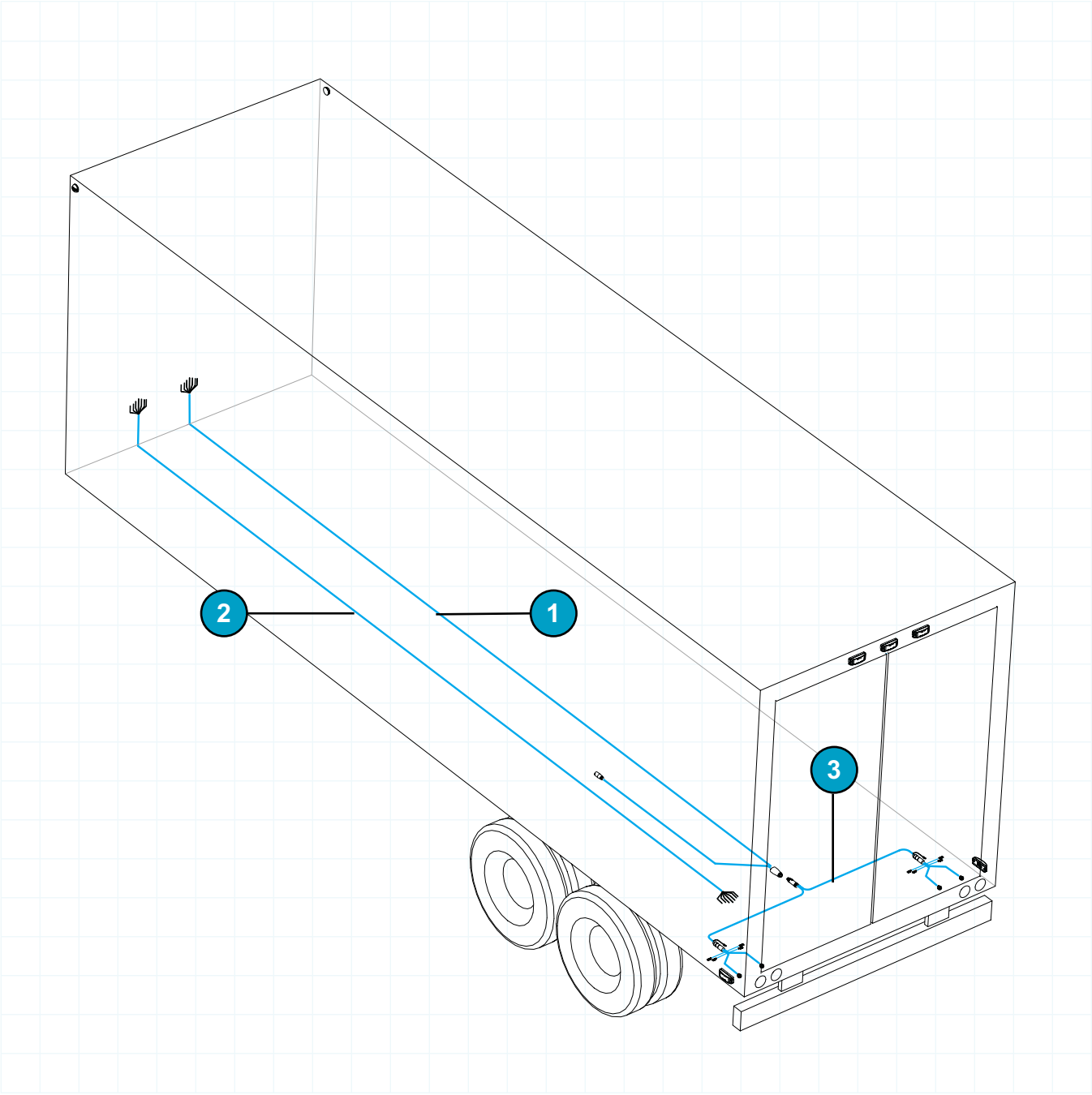
### Standard Female

### Slim-line Male

### Slim-line Female

### Slim-line Double Female

# 28 Ft. Van Trailer – Main and Rear Sill Harnesses




| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 1 | Main Harness | This harness connects the front receptacle to the rear sill harness. | 01-6670-L5 |
| 2 | Parallel Main Harness | This harness is power for the second trailer, front receptacle to the rear receptacle. | 01-6660-K3 |
| 3 | Rear Sill Harness | Power connection for rear tail and marker lamps. | 01-6758-86 |

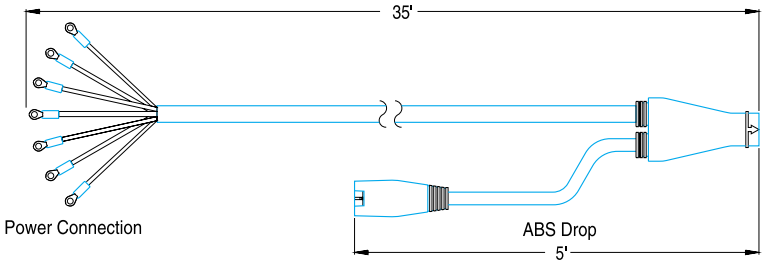
# 28 Ft. Van Trailer – Main and Rear Sill Harness Options

**NOTE: The parts highlighted in light blue are recommended by Grote.**

## 1 Main Harness

| Part # | Power Connection | Wire Ga. |
|---|---|---|
| 01-6670-L4 | Nose Box | 10/12 x 6 |
| **01-6670-L5*** | **Ring Terminals** | **8/10/10/12 x 4** |

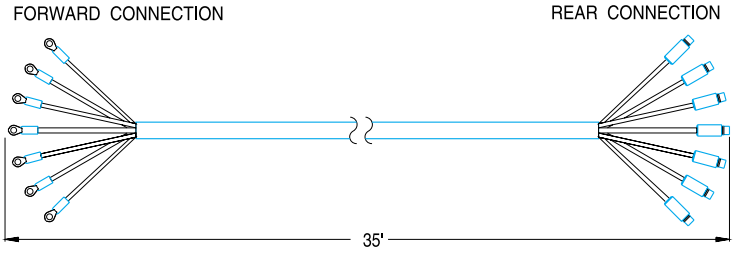
*Recommended Part Illustrated below




## 2 Parallel Main Harness (for second trailer option)

| Part # | Forward Connection | Rear Connection | Wire Ga. |
|---|---|---|---|
| 01-6661-A1 | Nose Box | Nose Box | 8/10/10/12 x 4 |
| **01-6660-K3*** | **Ring Terminals** | **Nose Box** | **8/10/10/12 x 4** |

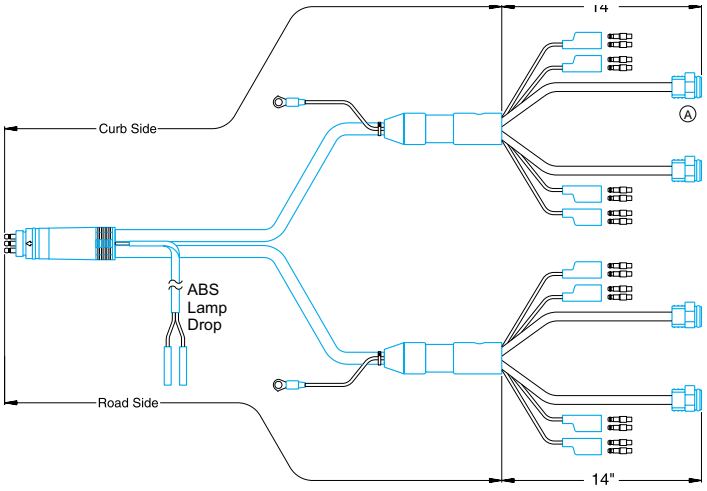
*Recommended Part Illustrated below




## 3 Rear Sill Harness

| Part # | Style | Lamp Plug "A" | Curb Side | Road Side | ABS Drop |
|---|---|---|---|---|---|
| 01-6757-78 | Straight Through | Female Pin | 60" | 50" | 52" |
| 01-6757-79 | Straight Through | Female Pin | 89" | 16" | 18" |
| **01-6758-86** | **Straight Through*** | **Male Pin** | **60"** | **50"** | **52"** |
| 01-6758-87 | Straight Through | Male Pin | 89" | 16" | 18" |

*Recommended Part Illustrated below

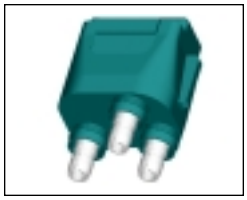



## Connection Options

(See also page 6)

Straight Male Pin

90° Male Pin


Female Pin

Nose Box

1/4" Molded Ring Terminal (For Rear Sill) (Redundant Ground)

Standard #10 Ring Terminal

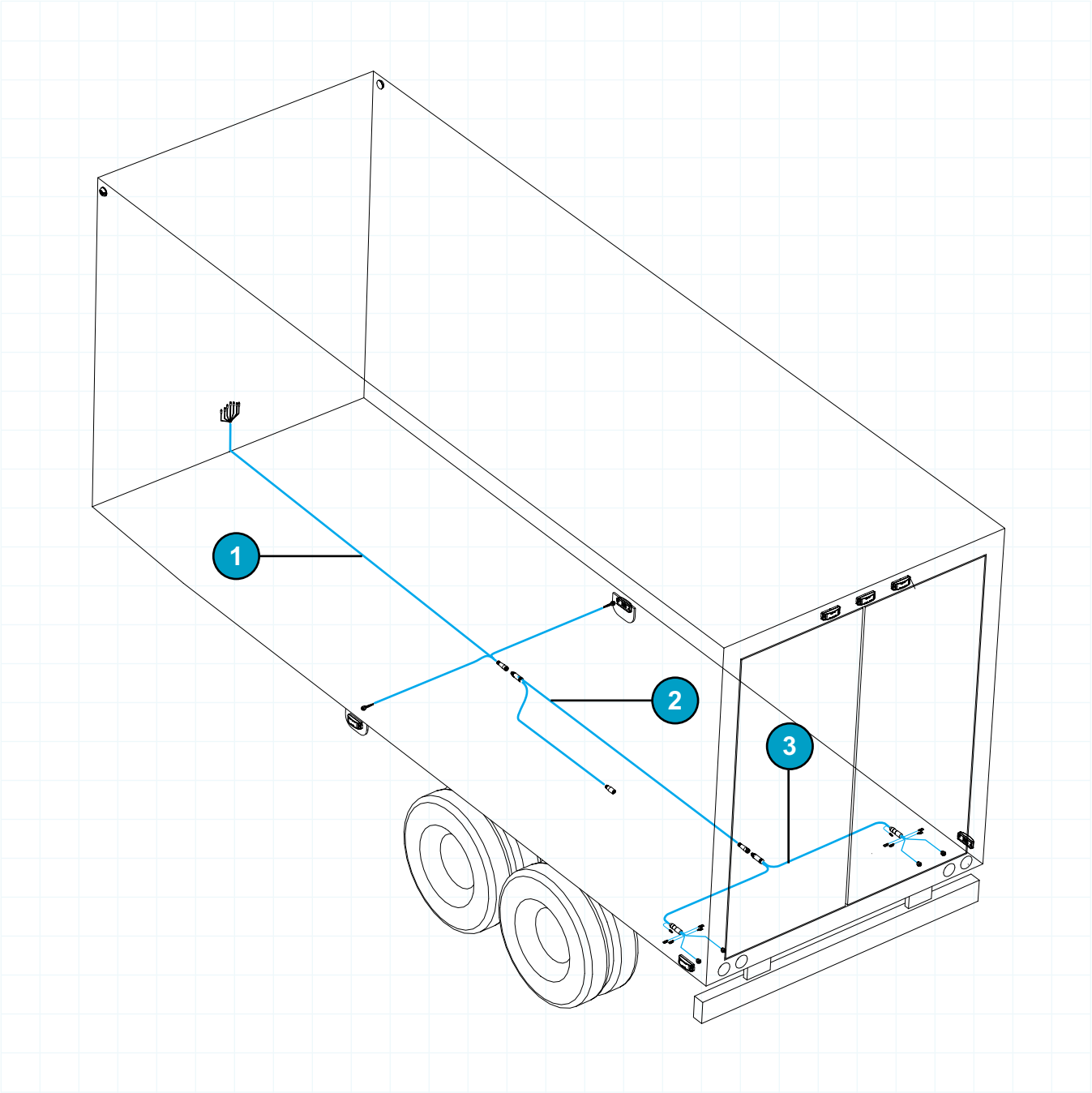
## Gauge Chart

| 10/12 x 6 |
|---|
| 10- White (Ground) |
| All others 12 gauge |

## Gauge Chart

| 8/10/10/12 x 4 |
|---|
| 8- White (Ground) |
| 10- Red & Blue |
| All others 12 gauge |

# 48-53 Ft. Van Trailer – Main and Rear Sill Harnesses



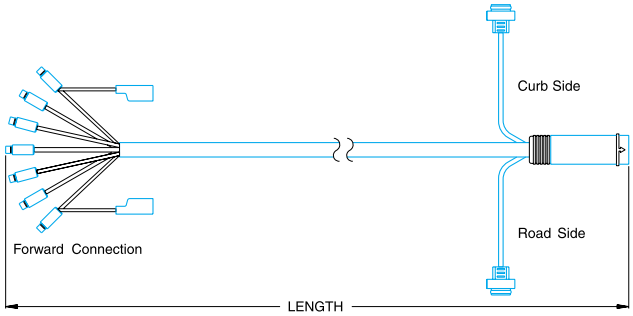

| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 1 | Forward Main Harness | From the nosebox to the middle of the trailer | 01-6661-A2 |
| 2 | Intermediate Harness | From the middle of the trailer to the rear sill. | 01-6605-W7 |
| 3 | Rear Sill Harness | Power connection for rear tail and marker lamps. | 01-6758-86 |

# 48-53 Ft. Van Trailer – Main and Rear Sill Harness Options

## 1 Forward Main Harness

| Part # | Forward Connection | Curb Side | Road Side | Wire Gauge | Length |
|---|---|---|---|---|---|
| 01-6660-M6** | Nose Box | 108" | 15" | 10/12 x 6 | 31' 3" (375") |
| **01-6661-A2*** | **Nose Box** | **60"** | **60"** | 10/12 x 6 | **31' 3" (375")** |
| 01-6605-W3** | Ring Term | 108" | 15" | 10/12 x 6 | 31' 3" (375") |
| 01-6606-X3 | Ring Term | 60" | 60" | 10/12 x 6 | 31' 3" (375") |

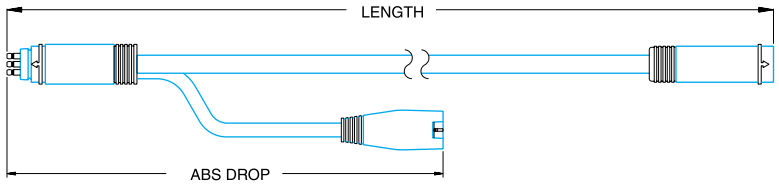
*Recommended Part Illustrated Below **Offset Main, explanation below right




## 2 Intermediate Main Harness

| Part # | Length | ABS Drop | Wire Ga. |
|---|---|---|---|
| **01-6605-W7*** | **28' 6" (342")** | **132"** | **10/12 x 6** |
| 01-6605-X4 | 24' 6" (288") | 175" | 10/12 x 6 |

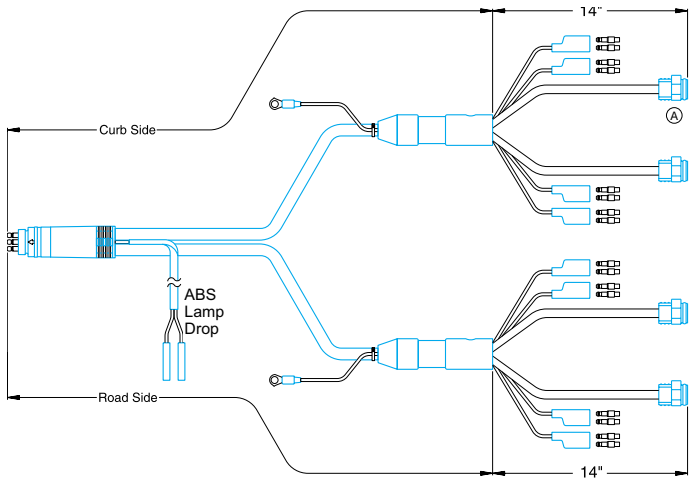
*Recommended Part Illustrated Below




## 3 Rear Sill Harness

| Part # | Style | Lamp Plug "A" | Curb Side | Road Side | ABS Drop |
|---|---|---|---|---|---|
| 01-6757-78 | Straight Through | Female Pin | 60" | 50" | 52" |
| 01-6757-79** | Straight Through | Female Pin | 89" | 16" | 18" |
| **01-6758-86*** | **Straight Through** | **Male Pin** | **60"** | **50"** | **52"** |
| 01-6758-87** | Straight Through | Male Pin | 89" | 16" | 18" |

*Recommended Part Illustrated Below **Offset Rear Sill




## Connection Options

(See also page 6)

Straight Male Pin

90° Male Pin

Female Pin

Nose Box

1/4" Molded Ring Terminal (For Rear Sill) (Redundant Ground)

Standard #10 Ring Terminal

### **Offset Main

Used in applications where Main harness is routed down side of trailer as opposed to down the center.

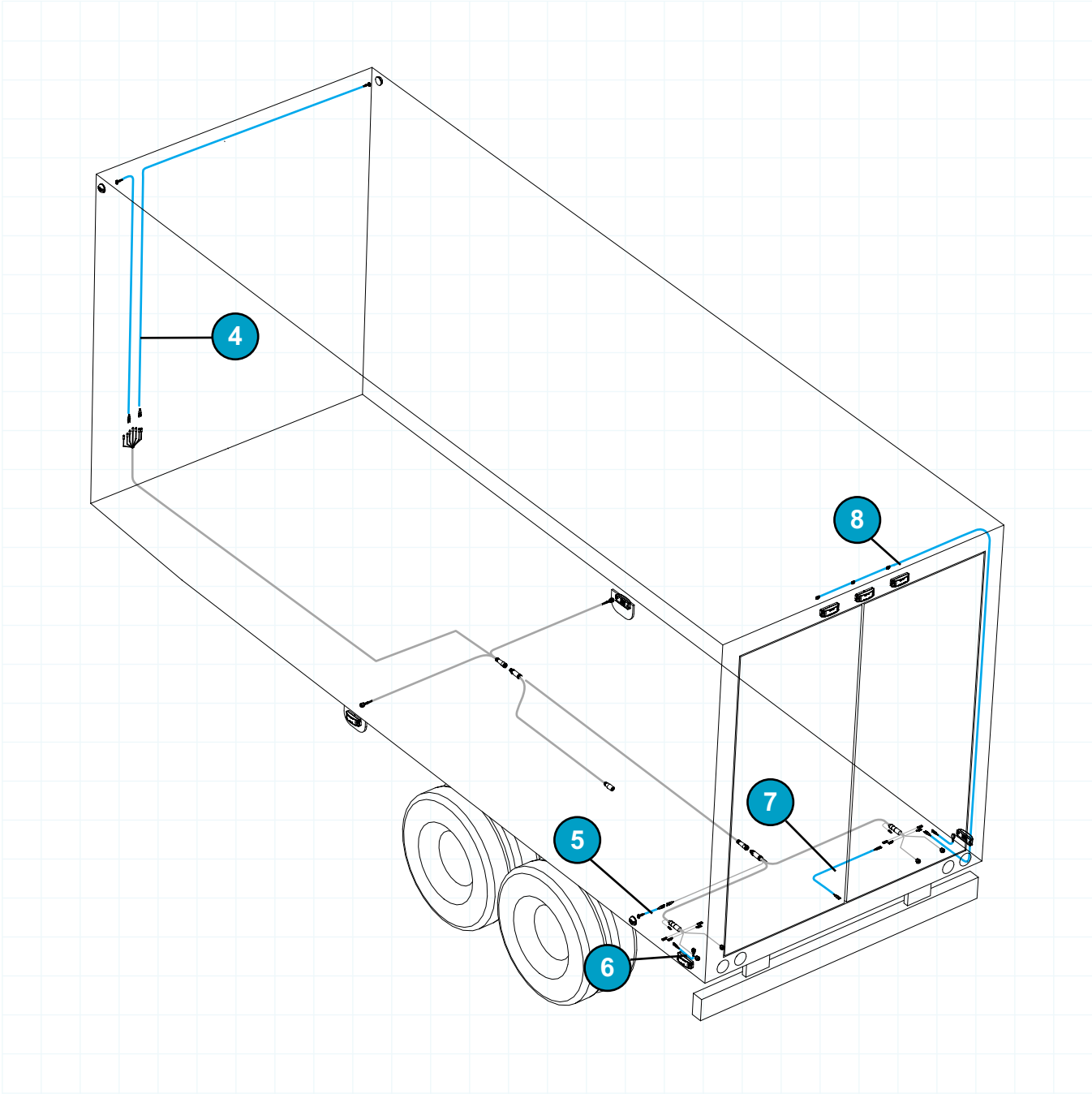
### Gauge Chart

**10/12 x 6**

**10- White (Ground)**

**All others 12 gauge**

# 28-53 Ft. Van Trailer – Marker Lamp Harnesses

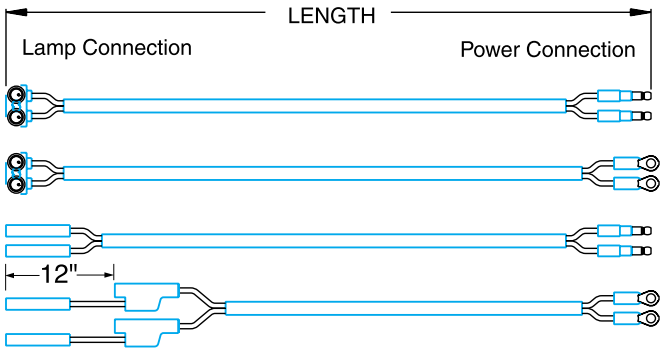



| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 4 | Front Marker | Two required. Connects at front main or nosebox.<br>Note: Match main harness power connection. | 01-3600-A7 (Roadside)<br>01-3600-A8 (Curbside) |
| 5 | ABS Fault Lamp | One required. Connects to drop on rear sill. | 05-2001-34 |
| 6 | Rear Marker | Two required. Connects to rear sill. | 01-6707-A9 |
| 7 | License Lamp | One required. Connects to rear sill. | 01-6622-12 |
| 8 | Rear I.D. | One required. Connects to rear sill. | 01-6707-C3 |

# 28-53 Ft. Van Trailer - Marker Lamp Harness Options

## 4 Front Marker Harness

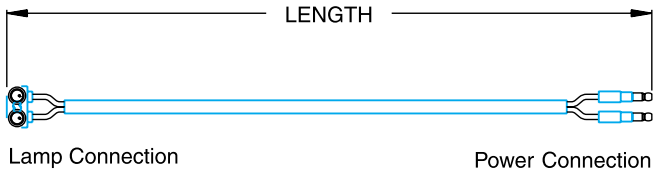
| Part # | Length | Lamp Connection | Power Connection | Side |
|---|---|---|---|---|
| **01-3600-A7**** | **96"** | **Marker lamp plug** | **.180 Slim-Line Male** | **Road** |
| **01-3600-A8**** | **144"** | **Marker lamp plug** | **.180 Slim-Line Male** | **Curb** |
| 01-3600-A9** | 96" | Marker lamp plug | Ring Terminal | Road |
| 01-3600-C1** | 144" | Marker lamp plug | Ring Terminal | Curb |
| 01-6622-22** | 96" | .180 Slim-Line Female | .180 Slim-Line Male | Road |
| 05-2018-93** | 144" | .180 Slim-Line Female | .180 Slim-Line Male | Curb |
| 01-6620-C8 | 96" | .180 Slim-Line Female | Ring Terminal | Road |
| 01-6620-C9 | 144" | .180 Slim-Line Female | Ring Terminal | Curb |
| 01-6621-C1 | 96" | .180 Slim-Line Female Flo-Thru | .180 Slim-Line Male | Road |
| 01-6621-C2 | 144" | .180 Slim-Line Female Flo-Thru | .180 Slim-Line Male | Curb |
| 01-6621-C3** | 96" | .180 Slim-Line Female Flo-Thru | Ring Terminal | Road |
| 01-6621-C4** | 144" | .180 Slim-Line Female Flo-Thru | Ring Terminal | Curb |




**Flo-thru for two corner lamps per side

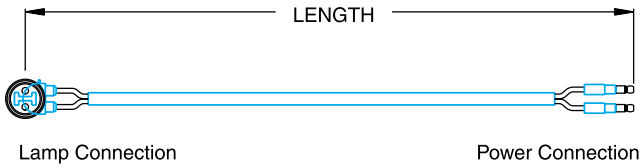
## 5 ABS Fault Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 01-3600-A6 | 60" | Marker lamp plug | .180 Slim-Line Male |
| **05-2001-34*** | **72"** | **Marker lamp plug** | **.180 Slim-Line Male** |
| 01-6622-12 | 60" | .180 Slim-Line Female | .180 Slim-Line Male |
| 01-6620-D1 | 72" | .180 Slim-Line Female | .180 Slim-Line Male |



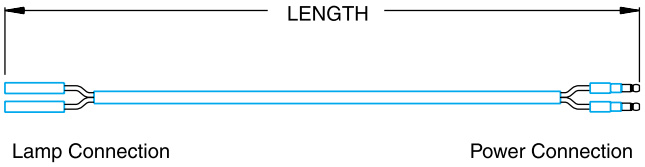

## 6 Rear Marker Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 05-2006-21 | 24" | Marker lamp plug | .180 Slim-Line Male |
| **01-6707-A9** | **24"** | **Turtleback II** | **.180 Slim-Line Male** |
| 01-6693-74 | 24" | Thinline LED | .180 Slim-Line Male |
| 05-2018-47 | 24" | .180 Slim-Line Female | .180 Slim-Line Male |



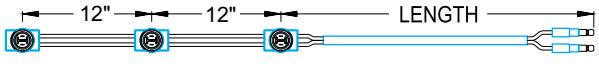

## 7 License Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-6622-12*** | **60"** | **.180 Slim-Line Female** | **.180 Slim-Line Male** |
| 01-6707-C1 | 60" | Turtleback II | .180 Slim-Line Male |
| 01-6698-77 | 60" | Series 19 | .180 Slim-Line Male |




## 8 Rear I.D. Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 01-6707-C2 | 36" | Turtleback II | .180 Slim-Line Male |
| **01-6707-C3** | **120"** | **Turtleback II** | **.180 Slim-Line Male** |
| 01-6693-22* | 36" | Thinline LED | .180 Slim-Line Male |
| 01-6694-K2* | 120" | Thinline LED | .180 Slim-Line Male |
| 01-3651-E3 | 36" | Marker lamp plug | .180 Slim-Line Male |
| 01-3650-G7 | 120" | Marker lamp plug | .180 Slim-Line Male |
| 01-6621-C7 | 36" | .180 Slim-Line Female | .180 Slim-Line Male |
| 01-6621-A9 | 120" | .180 Slim-Line Female | .180 Slim-Line Male |




*Part Illustrated

## Connection Options

(See also page 6)

Turtleback II

Thin Line & 3" LED

Series 19

Marker Lamp Plug

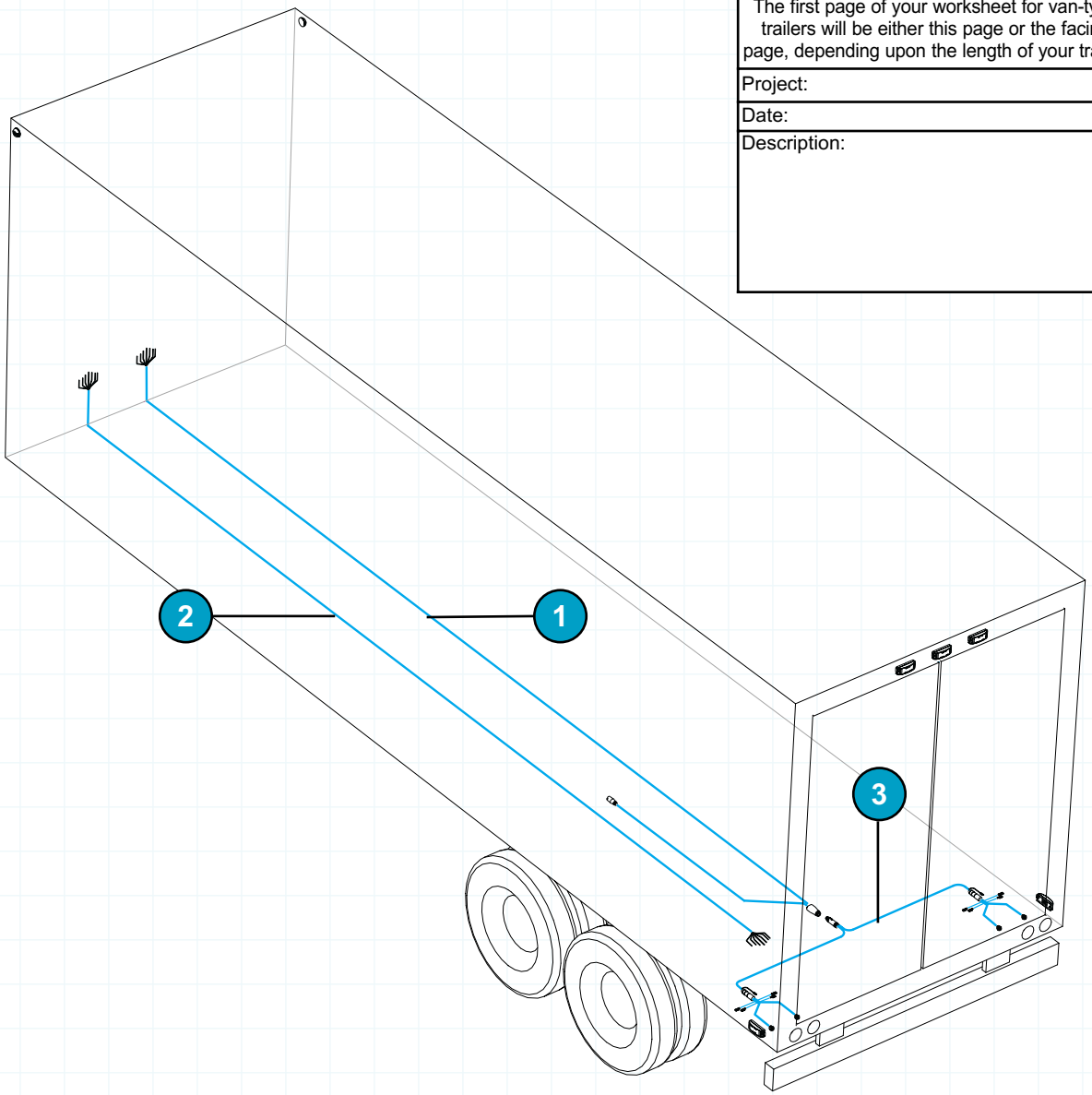
# 28 Ft. Van Trailer – Main and Rear Sill Harnesses

**WORKSHEET (1 of 2)**
The first page of your worksheet for van-type trailers will be either this page or the facing page, depending upon the length of your trailer.

Project:

Date:

Description:




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 1 Forward Main Harness | | | |
| 2 Parallel Main Harness | | | |
| 3 Rear Sill Harness | | | |

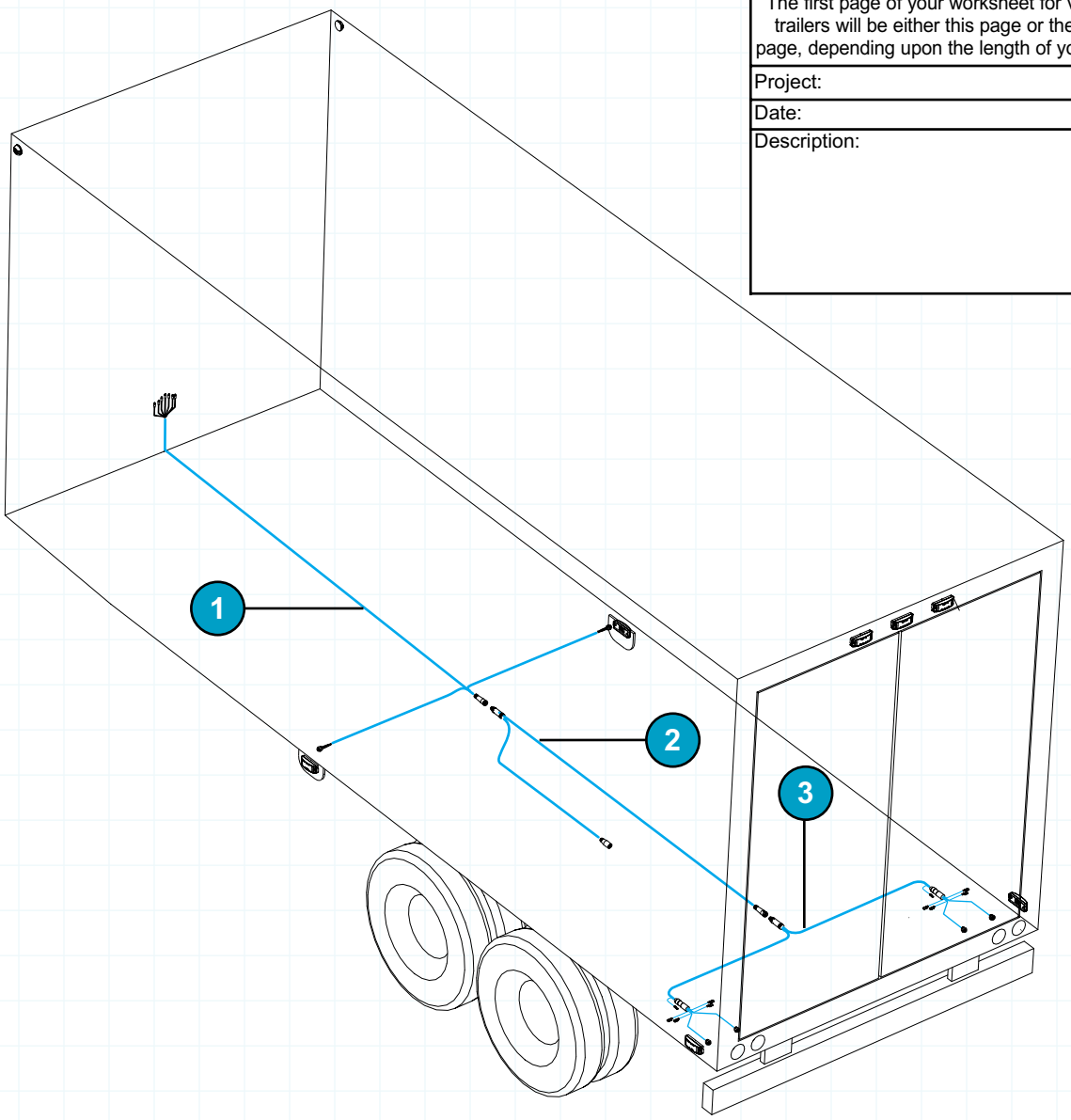
# 48-53 Ft. Van Trailer – Main and Rear Sill Harnesses

**WORKSHEET (1 of 2)**
The first page of your worksheet for van-type trailers will be either this page or the facing page, depending upon the length of your trailer.

Project:

Date:

Description:




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 1 Forward Main Harness | | | |
| 2 Intermediate Main Harness | | | |
| 3 Rear Sill Harness | | | |

# 28-53 Ft. Van Trailer – Marker Lamp Harnesses

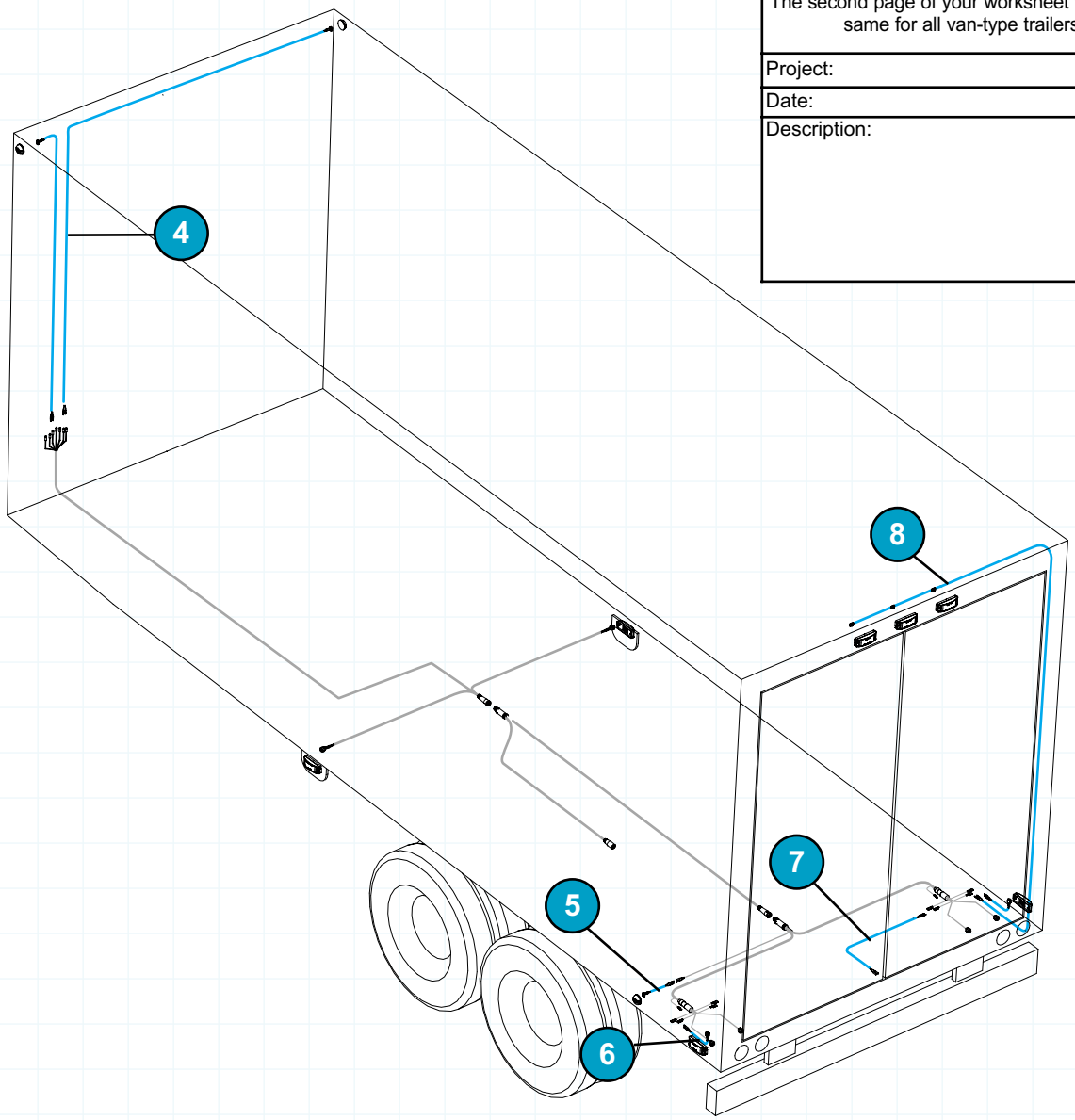
***Marker lamp options are same for any length of trailer**

**WORKSHEET (2 of 2)**
The second page of your worksheet will be the same for all van-type trailers.

Project:

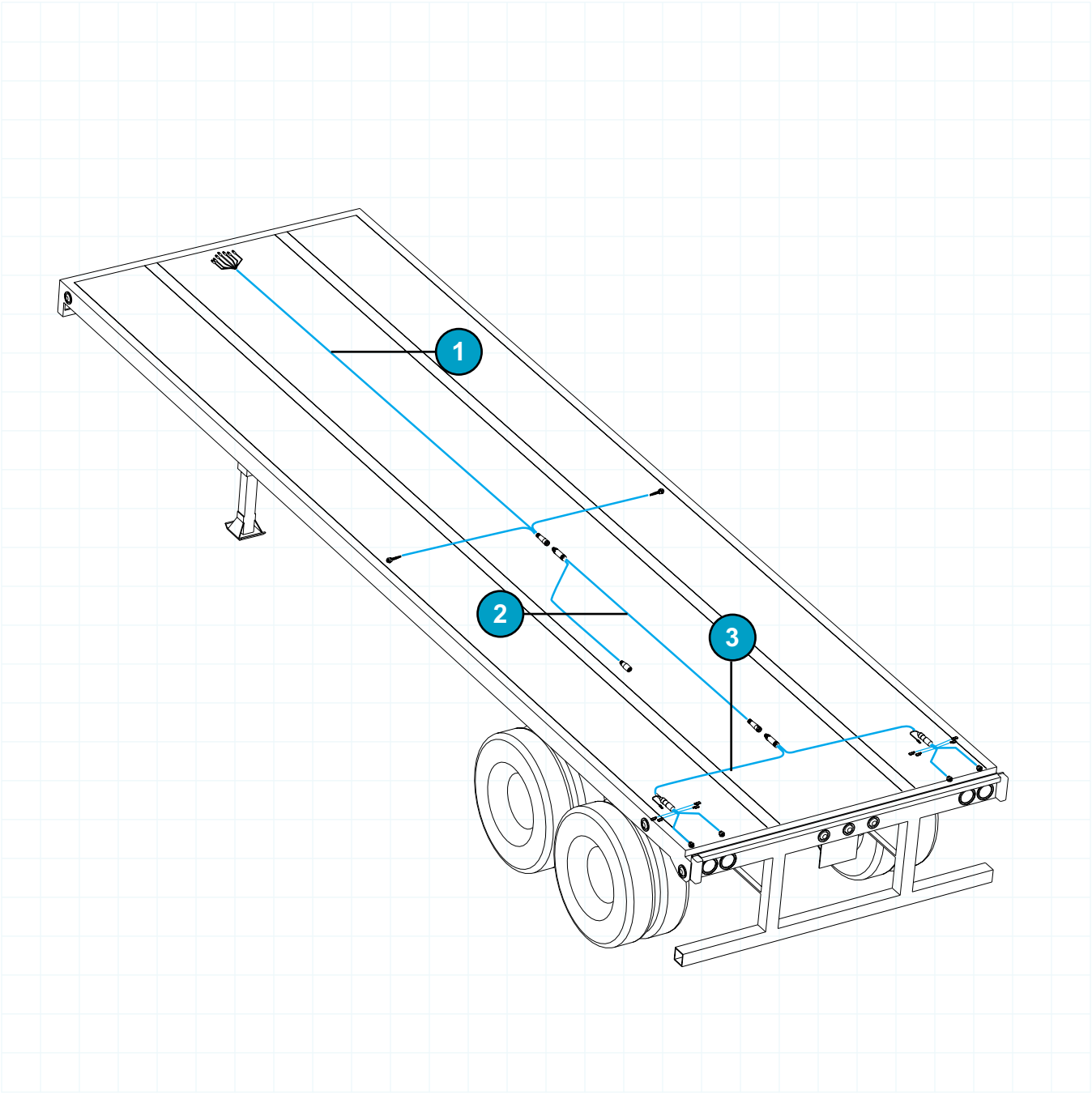
Date:

Description:




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 4 Front Marker | | | |
| 5 ABS Fault Lamp | | | |
| 6 Rear Marker | | | |
| 7 License Lamp | | | |
| 8 Rear I.D. | | | |

# 53’ Flatbed Trailer - Main and Rear Sill Harness



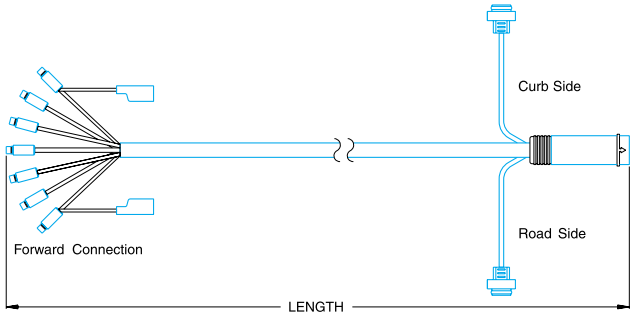

| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 1 | Forward Main Harness | From the nosebox to the middle of the trailer | 01-6661-A2 |
| 2 | Intermediate Harness | From the middle of the trailer to the rear sill. | 01-6605-W7 |
| 3 | Rear Sill Harness | Power connection for rear tail and marker lamps. | 01-6758-86 |

# 53’ Flatbed Trailer - Main and Rear Sill Harness Options

## 1 Forward Main Harness

| Part # | Forward Connection | Curb Side | Road Side | Wire Gauge | Length |
|---|---|---|---|---|---|
| 01-6660-M6** | Nose Box | 108" | 15" | 10/12 x 6 | 31' 3" (375") |
| **01-6661-A2*** | **Nose Box** | **60"** | **60"** | **10/12 x 6** | **31' 3" (375")** |
| 01-6605-W3** | Ring Term | 108" | 15" | 10/12 x 6 | 31' 3" (375") |
| 01-6606-X3 | Ring Term | 60" | 60" | 10/12 x 6 | 31' 3" (375") |

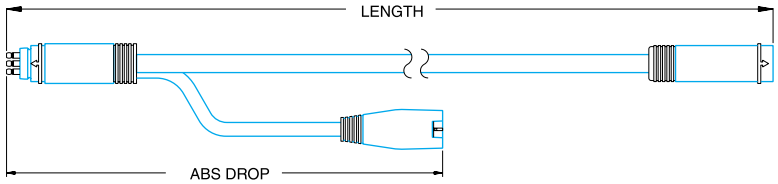
*Recommended Part Illustrated Below **Offset Main, explanation below right




## 2 Intermediate Main Harness

| Part # | Length | ABS Drop | Wire Ga. |
|---|---|---|---|
| **01-6605-W7*** | **28' (342")** | **132"** | **10/12 x 6** |
| 01-6605-X4 | 24' (288") | 175" | 10/12 x 6 |

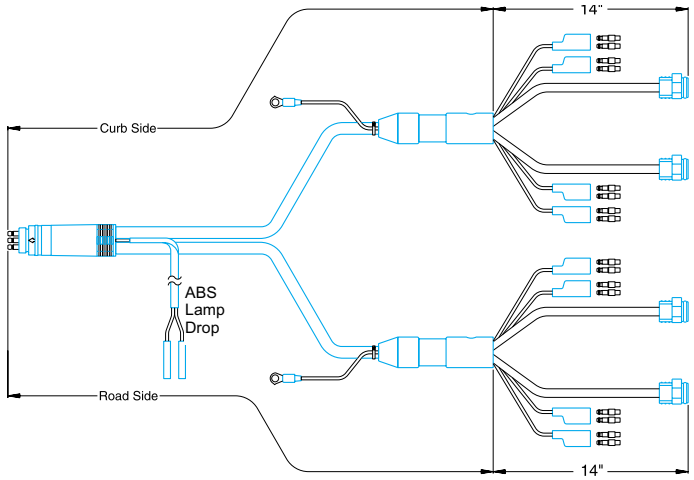
*Recommended Part Illustrated Below




## 3 Rear Sill Harness

| Part # | Style | Lamp Plug “A” | Curb Side | Road Side | ABS Drop |
|---|---|---|---|---|---|
| 01-6757-78 | Straight Through | Female Pin | 60" | 50" | 52" |
| 01-6757-79*** | Straight Through | Female Pin | 89" | 16" | 18" |
| **01-6758-86*** | **Straight Through** | **Male Pin** | **60"** | **50"** | **52"** |
| 01-6758-87*** | Straight Through | Male Pin | 89" | 16" | 18" |

*Recommended Part Illustrated Below ***Offset Rear Sill




## Connection Options

(See also page 6)

Straight Male Pin

90º Male Pin

Female Pin

Nose Box

1/4” Molded Ring Terminal (For Rear Sill) (Redundant Ground)

Standard #10 Ring Terminal

### **Offset Main

Used in applications where main harness is routed down side of trailer as opposed to down the center.

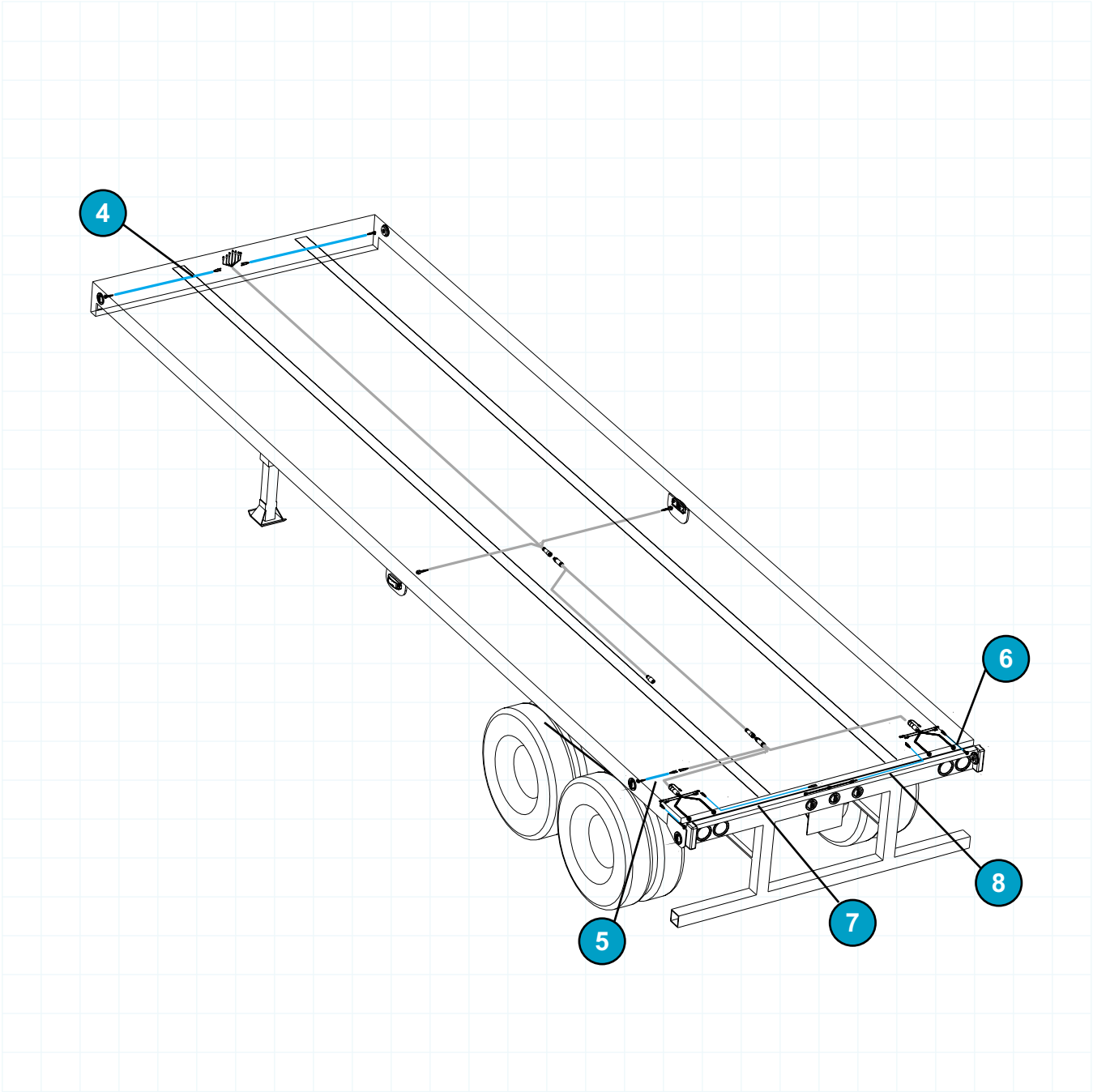
### Gauge Chart

**10 / 12 x 6**

**10- White (Ground)**

**All others 12 gauge**

# Flatbed Trailer - Marker Lamp Harnesses

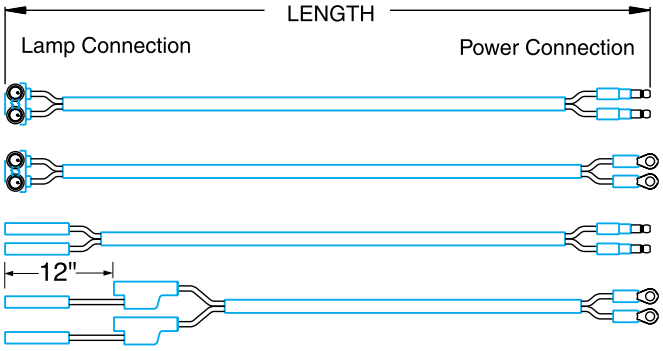



| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 4 | Front Marker | Two Required. Connect to front receptacle. | 01-3600-C2 (Roadside)<br>01-3600-A7 (Curbside) |
| 5 | ABS Fault Lamp | One Required | 05-2001-34 |
| 6 | Rear Marker | Two Required | 01-6707-A9 |
| 7 | License Lamp | One Required | 01-6622-12 |
| 8 | Rear I.D. | One Required | 01-6707-C2 |

# 53’ Flatbed Trailer - Marker Lamp Harness Options

## 4 Front Marker Harness

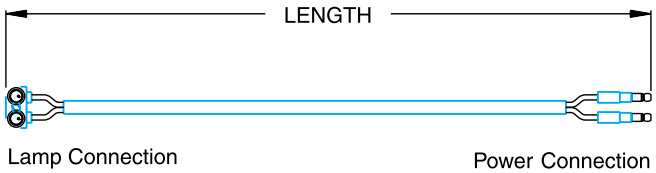
| Part # | Length | Lamp Connection | Power Connection | Side |
|---|---|---|---|---|
| **01-3600-C2**** | **48"** | **Marker lamp plug** | **.180 Slim-line Male** | **Road** |
| **01-3600-A7**** | **96"** | **Marker lamp plug** | **.180 Slim-line Male** | **Curb** |
| 01-3600-C3** | 48" | Marker lamp plug | Ring Terminal | Road |
| 01-3600-A9** | 96" | Marker lamp plug | Ring Terminal | Curb |
| 01-6620-E9** | 48 | .180 Slim-line Female | .180 Slim-line Male | Road |
| 01-6622-22** | 96" | .180 Slim-line Female | .180 Slim-line Male | Curb |
| 01-6620-F1 | 48" | .180 Slim-line Female | Ring Terminal | Road |
| 01-6620-C8 | 96" | .180 Slim-line Female | Ring Terminal | Curb |
| 01-6620-F2 | 48" | .180 Slim-line Female Flo-Thru | .180 Slim-line Male | Road |
| 01-6621-C1 | 96" | .180 Slim-line Female Flo-Thru | .180 Slim-line Male | Curb |
| 01-6620-F3** | 48" | .180 Slim-line Female Flo-Thru | Ring Terminal | Road |
| 01-6621-C3** | 96" | .180 Slim-line Female Flo-Thru | Ring Terminal | Curb |




**Flo-thru for two corner lamps per side

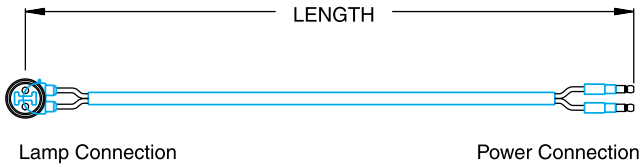
## 5 ABS Fault Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 01-3600-A6 | 60" | Marker lamp plug | .180 Slim-line Male |
| **05-2001-34*** | **72"** | **Marker lamp plug** | **.180 Slim-line Male** |
| 01-6622-12 | 60" | .180 Slim-line Female | .180 Slim-line Male |
| 01-6620-D1 | 72" | .180 Slim-line Female | .180 Slim-line Male |



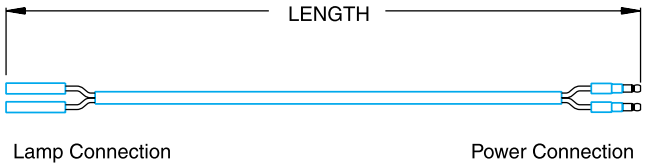

## 6 Rear Marker Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 05-2006-21 | 24" | Marker lamp plug | .180 Slim-line Male |
| **01-6707-A9*** | **24"** | **Turtleback II** | **.180 Slim-line Male** |
| 01-6693-74 | 24" | Thinline LED | .180 Slim-line Male |
| 05-2018-47 | 24" | .180 Slim-line Female | .180 Slim-line Male |



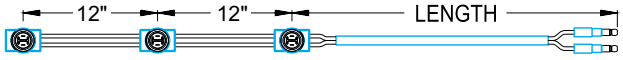

## 7 License Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-6622-12*** | **60"** | **.180 Slim-line Female** | **.180 Slim-line Male** |
| 01-6707-C1 | 60" | Turtleback II | .180 Slim-line Male |
| 01-6698-77 | 60" | Series 19 | .180 Slim-line Male |




## 8 Rear I.D. Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-6707-C2** | **36"** | **Turtleback II** | **.180 Slim-line Male** |
| 01-6693-22* | 36" | Thinline LED | .180 Slim-line Male |
| 01-3651-E3 | 36" | Marker lamp plug | .180 Slim-line Male |
| 01-6621-C7 | 36" | .180 Slim-line Female | .180 Slim-line Male |




*Part Illustrated

## Connection Options

(See also page 6)

Turtleback II

Thin Line & 3” LED

Series 19

Marker Lamp Plug

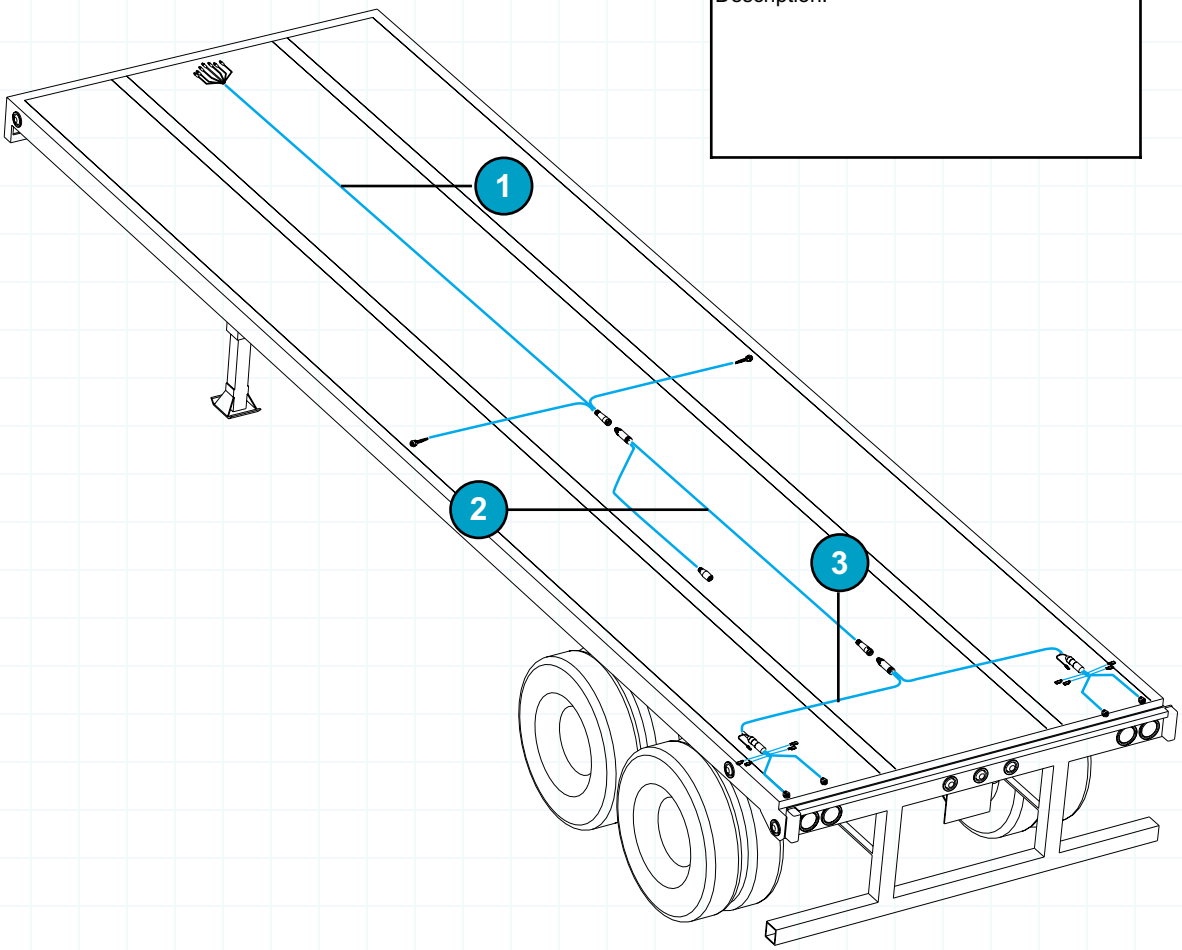
# 53’ Flatbed Trailer - Main and Rear Sill Harness

**WORKSHEET (1 of 2)**

Project:

Date:

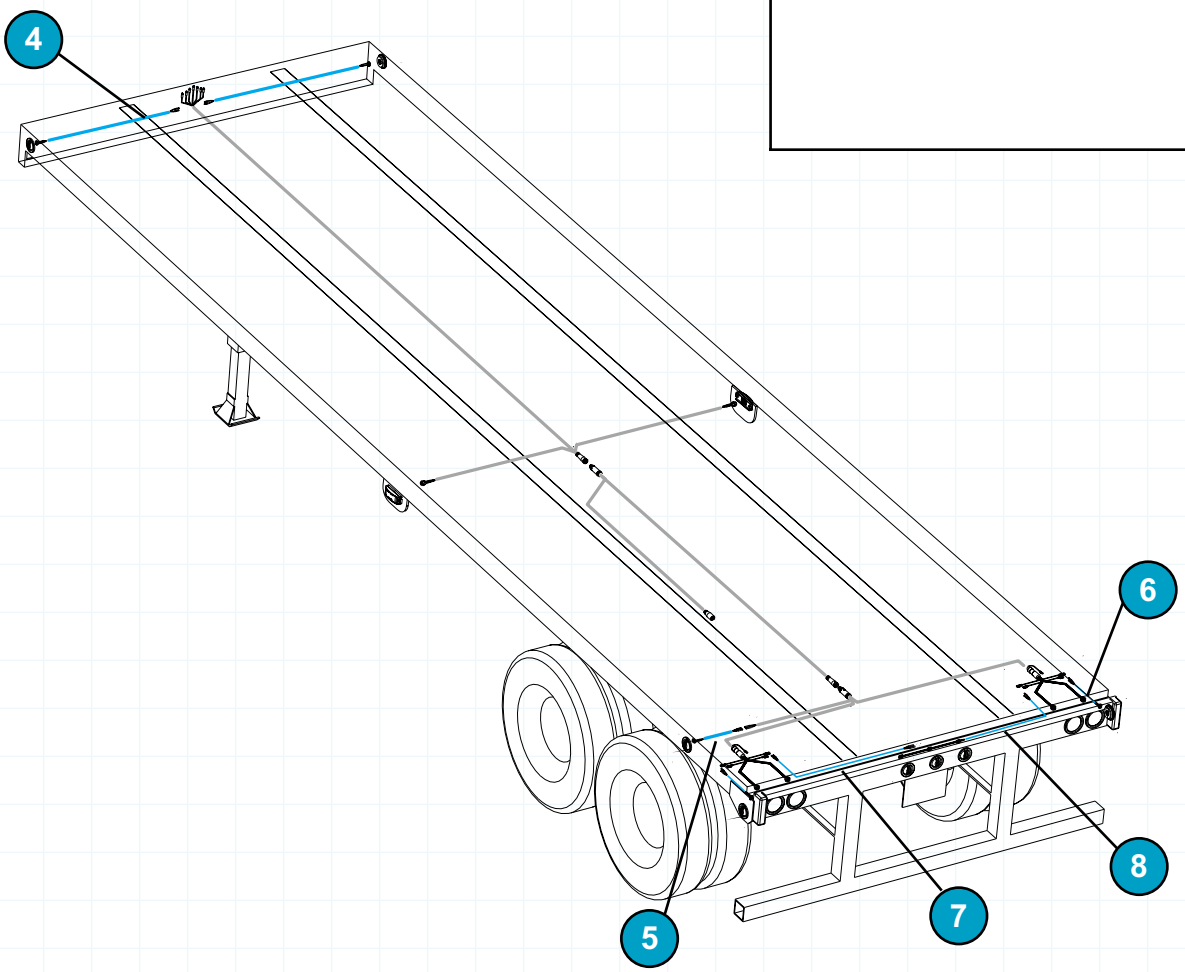
Description:




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 1 Forward Main Harness | | | |
| 2 Intermediate Harness | | | |
| 3 Rear Sill Harness | | | |

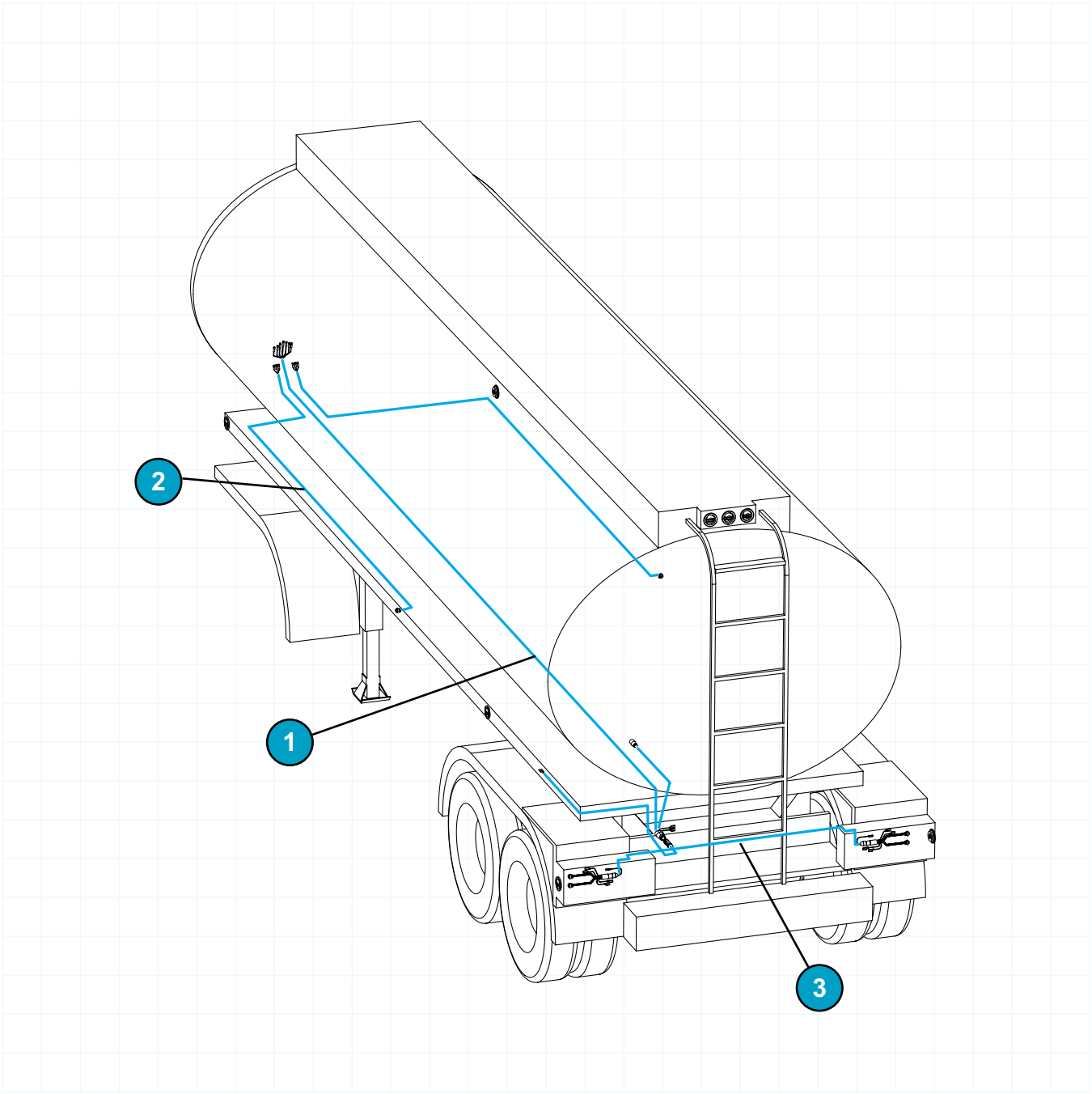
# Flatbed Trailer - Marker Harness

**WORKSHEET** (2 of 2)




| | Harness | Quantity | Comments | Part # |
|---|---|---|---|---|
| 4 | Front Marker | | | |
| 5 | ABS Fault Lamp | | | |
| 6 | Rear Marker | | | |
| 7 | License Lamp | | | |
| 8 | Rear I.D. | | | |

# 53’ Tanker Trailer - Main and Rear Sill Harness




| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 1 | Main Harness | From the nosebox to the rear of the trailer | 01-6661-H6 |
| 2 | Mid Turn Harness | Two required. From the nosebox to middle of trailer. | 01-6681-T5 (Roadside)<br>01-6681-T4 (Curbside) |
| 3 | Rear Sill Harness | Power connection for rear tail and marker lamps. | 01-6758-87 |

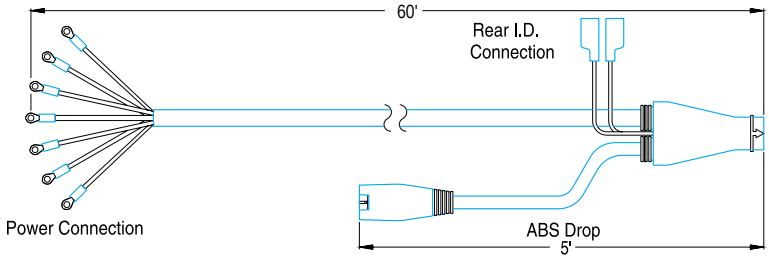
# 53’ Tanker Trailer - Main, Mid-turn and Rear Sill Harness Options

**NOTE: The parts highlighted in light blue are recommended by Grote.**

## 1 Main Harness

| Part # | Power Connection | Wire Ga. |
|---|---|---|
| **01-6661-H6*** | **Ring Terminals** | **8/10/10/12 x 4** |

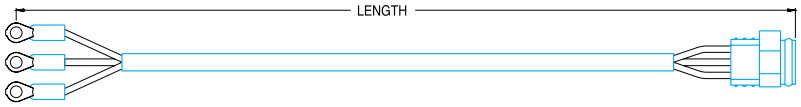
*Recommended Part Illustrated below




## 2 Mid-turn Harness*

| Part # | Length | Power Connection | Lamp Connection | Side |
|---|---|---|---|---|
| **01-6681-T5*** | **320"** | **Ring Terminals** | **Male Pin** | **Road** |
| **01-6681-T4*** | **320"** | **Ring Terminals** | **Male Pin** | **Curb** |
| 01-6681-U4 | 318" | Ring Terminals | Female Pin | Road |
| 01-6681-U3 | 372" | Ring Terminals | Female Pin | Curb |

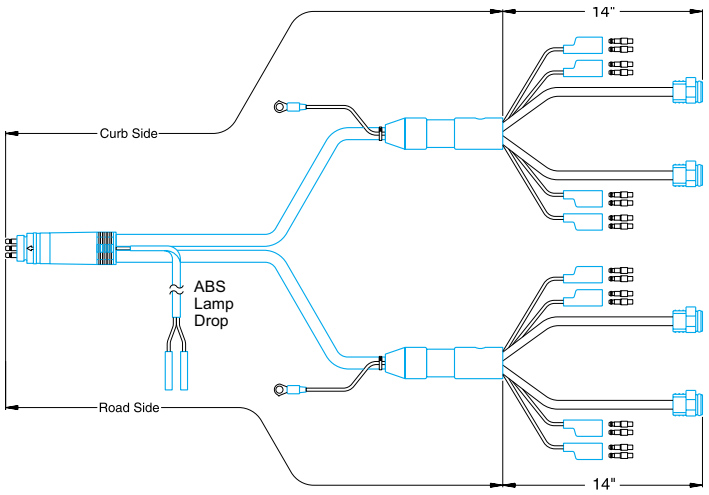
*Two required, one road side and one curb side.




## 3 Rear Sill Harness

| Part # | Lamp Plug “A” | Curb Side | Road Side | ABS Drop |
|---|---|---|---|---|
| 01-6757-78 | Female Pin | 60" | 50" | 52" |
| 01-6757-79** | Female Pin | 89" | 16" | 18" |
| 01-6758-86 | Male Pin | 60" | 50" | 52" |
| **01-6758-87*** | **Male Pin** | **89"** | **16"** | **18"** |

*Recommended Part Illustrated Below **Offset Main, explanation below right

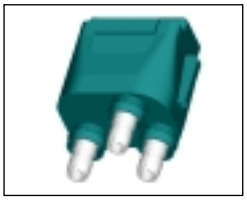



## Connection Options

(See also page 6)

**Straight Male Pin**

**90º Male Pin**


**Female Pin**

**Nose Box**

**1/4” Molded Ring Terminal (For Rear Sill)**

**Standard #10 Ring Terminal**

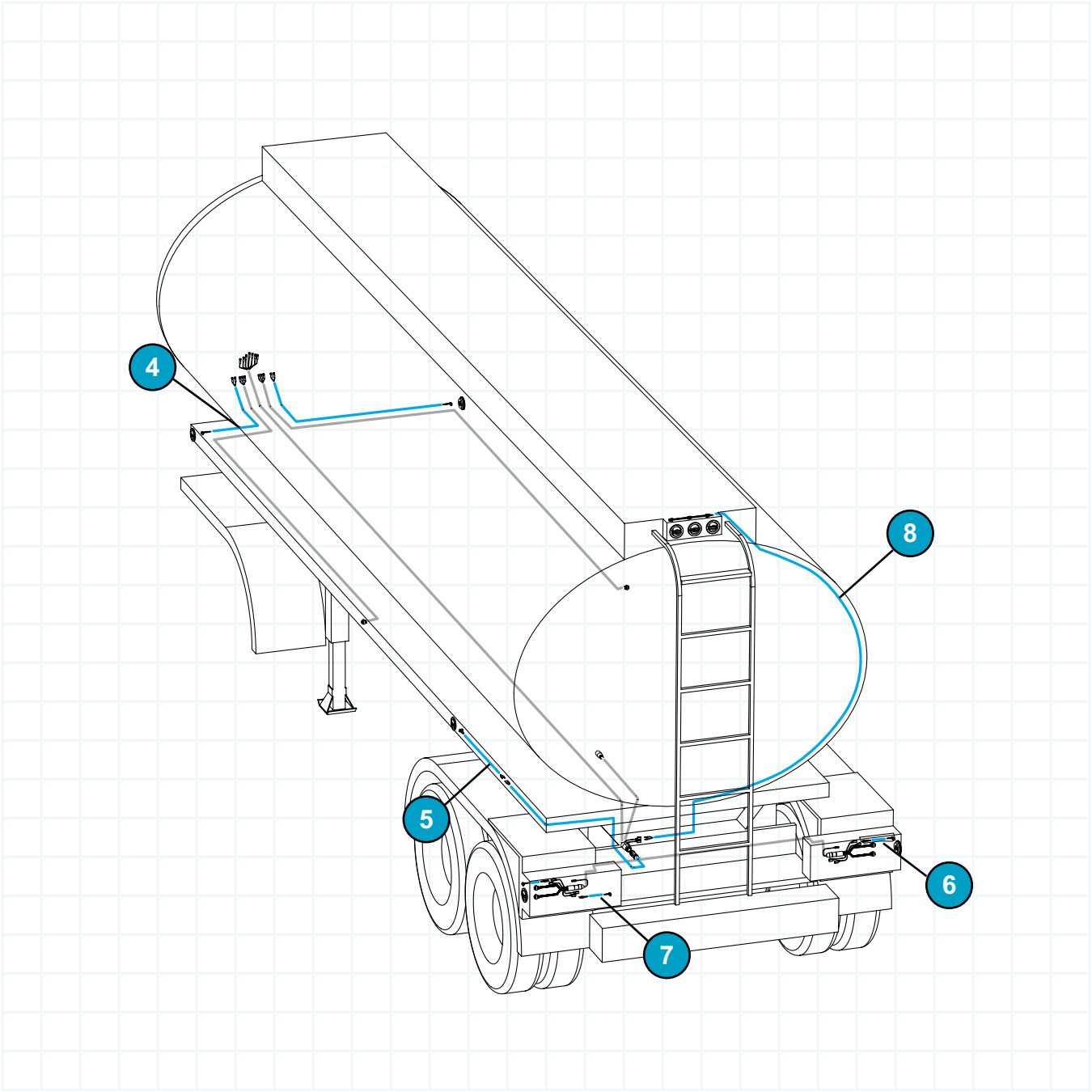
### **Offset Main

Used in applications where main harness is routed down side of trailer as opposed to down the center.

### Gauge Chart

| |
|---|
| **8 / 1 0 / 1 0 / 1 2 x 4** |
| **8- White (Ground)** |
| **10- Red & Blue** |
| **All others 12 gauge** |

# 53’ Tanker Trailer - Marker Harness

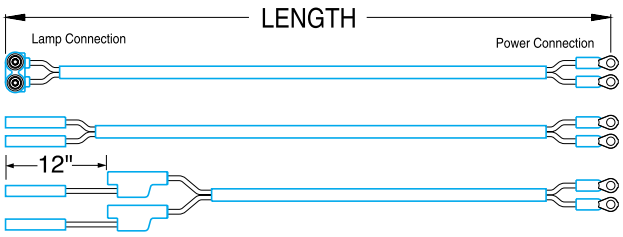



| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 4 | Front Marker | Two Required. Connect to front receptacle. | 01-3600-C3 (Roadside)<br>01-3600-A9 (Curbside) |
| 5 | ABS Fault Lamp | One Required | 05-2001-34 |
| 6 | Rear Marker | Two Required | 01-6707-A9 |
| 7 | License Lamp | One Required | 01-6622-12 |
| 8 | Rear I.D. | One Required | 01-6707-C3 |

# 53’ Tanker Trailer - Marker Lamp Harness Options

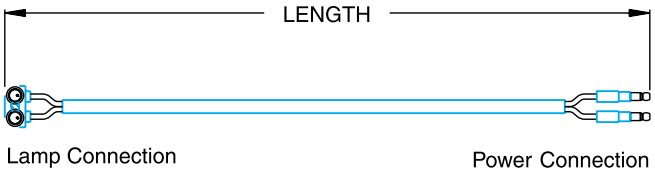
## 4 Front Marker Harness

| Part # | Length | Lamp Connection | Power Connection | Side |
|---|---|---|---|---|
| **01-3600-C3*** | **48"** | **Marker lamp plug** | **Ring Terminal** | **Road** |
| **01-3600-A9*** | **96"** | **Marker lamp plug** | **Ring Terminal** | **Curb** |
| 01-6620-F1* | 48" | .180 Slim-line Female | Ring Terminal | Road |
| 01-6620-C8* | 96" | .180 Slim-line Female | Ring Terminal | Curb |
| 01-6620-F3* | 48" | .180 Slim-line Female Flo-Thru | Ring Terminal | Road |
| 01-6621-C3* | 96" | .180 Slim-line Female Flo-Thru | Ring Terminal | Curb |



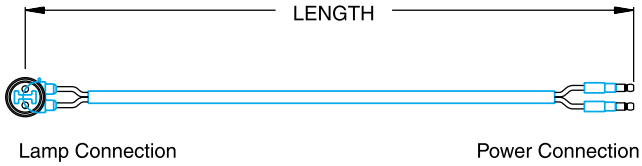

## 5 ABS Fault Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 01-3600-A6 | 60" | Marker lamp plug | .180 Slim-line Male |
| **05-2001-34*** | **72"** | **Marker lamp plug** | **.180 Slim-line Male** |
| 01-6622-12 | 60" | .180 Slim-line Female | .180 Slim-line Male |
| 01-6620-D1 | 72" | .180 Slim-line Female | .180 Slim-line Male |



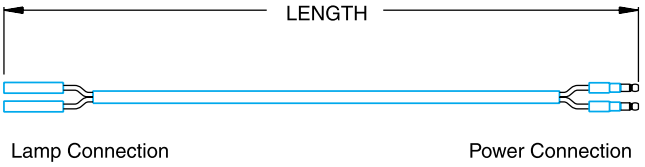

## 6 Rear Marker Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 05-2006-21 | 24" | Marker lamp plug | .180 Slim-line Male |
| **01-6707-A9*** | **24"** | **Turtleback II** | **.180 Slim-line Male** |
| 01-6693-74 | 24" | Thinline LED | .180 Slim-line Male |
| 05-2018-47 | 24" | .180 Slim-line Female | .180 Slim-line Male |



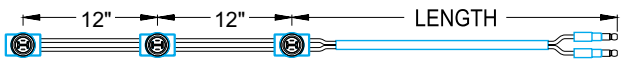

## 7 License Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-6622-12*** | **60"** | **.180 Slim-line Female** | **.180 Slim-line Male** |
| 01-6707-C1 | 60" | Turtleback II | .180 Slim-line Male |
| 01-6698-77 | 60" | Series 19 | .180 Slim-line Male |




## 8 Rear I.D. Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-6707-C3** | **120"** | **Turtleback II** | **.180 Slim-line Male** |
| 01-6694-K2* | 120" | Thinline LED | .180 Slim-line Male |
| 01-3650-G7 | 120" | Marker lamp plug | .180 Slim-line Male |
| 01-6621-A9 | 120" | .180 Slim-line Female | .180 Slim-line Male |




*Part Illustrated

## Connection Options

(See also page 6)

Turtleback II

Thin Line & 3” LED

Series 19

Marker Lamp Plug

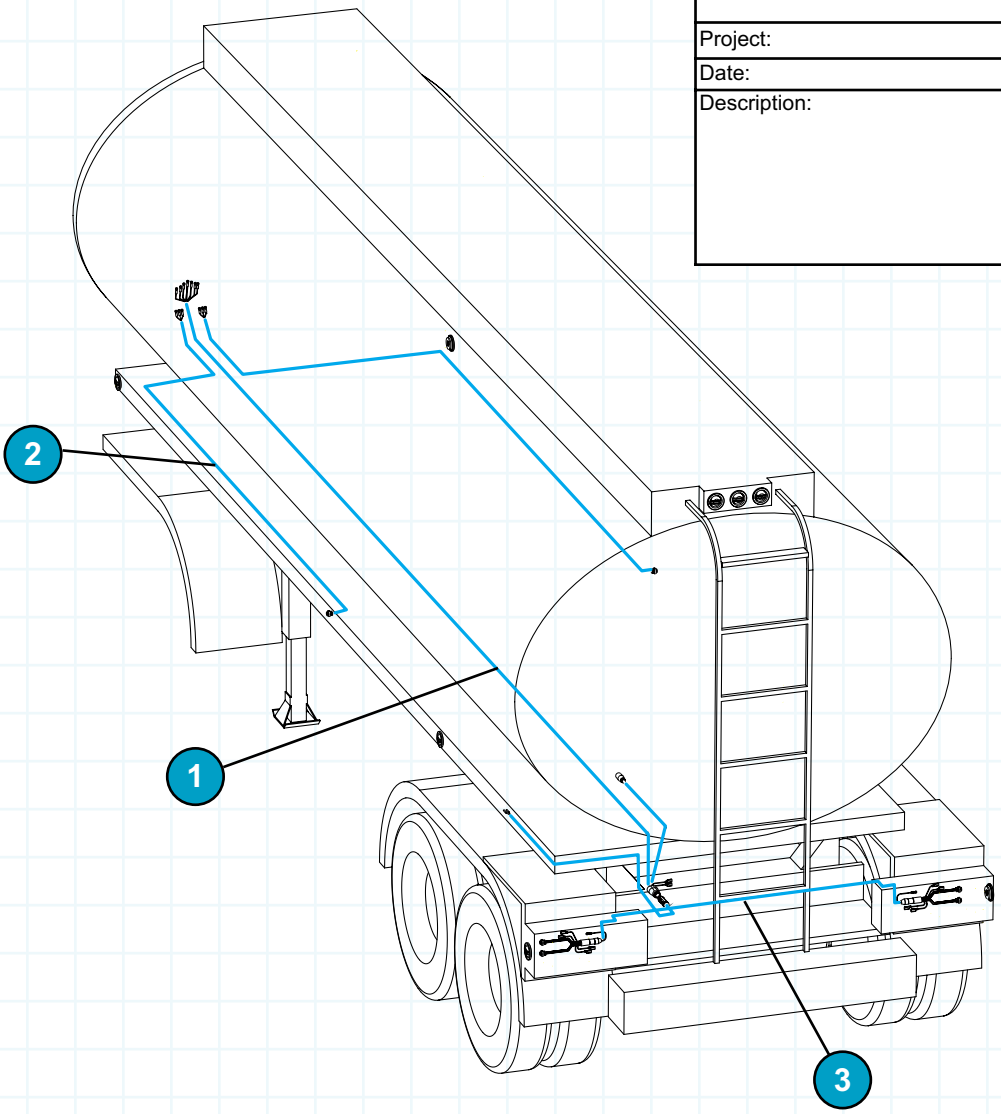
# 53’ Tanker Trailer - Main and Rear Sill Harness

**WORKSHEET (1 of 2)**

Project:

Date:

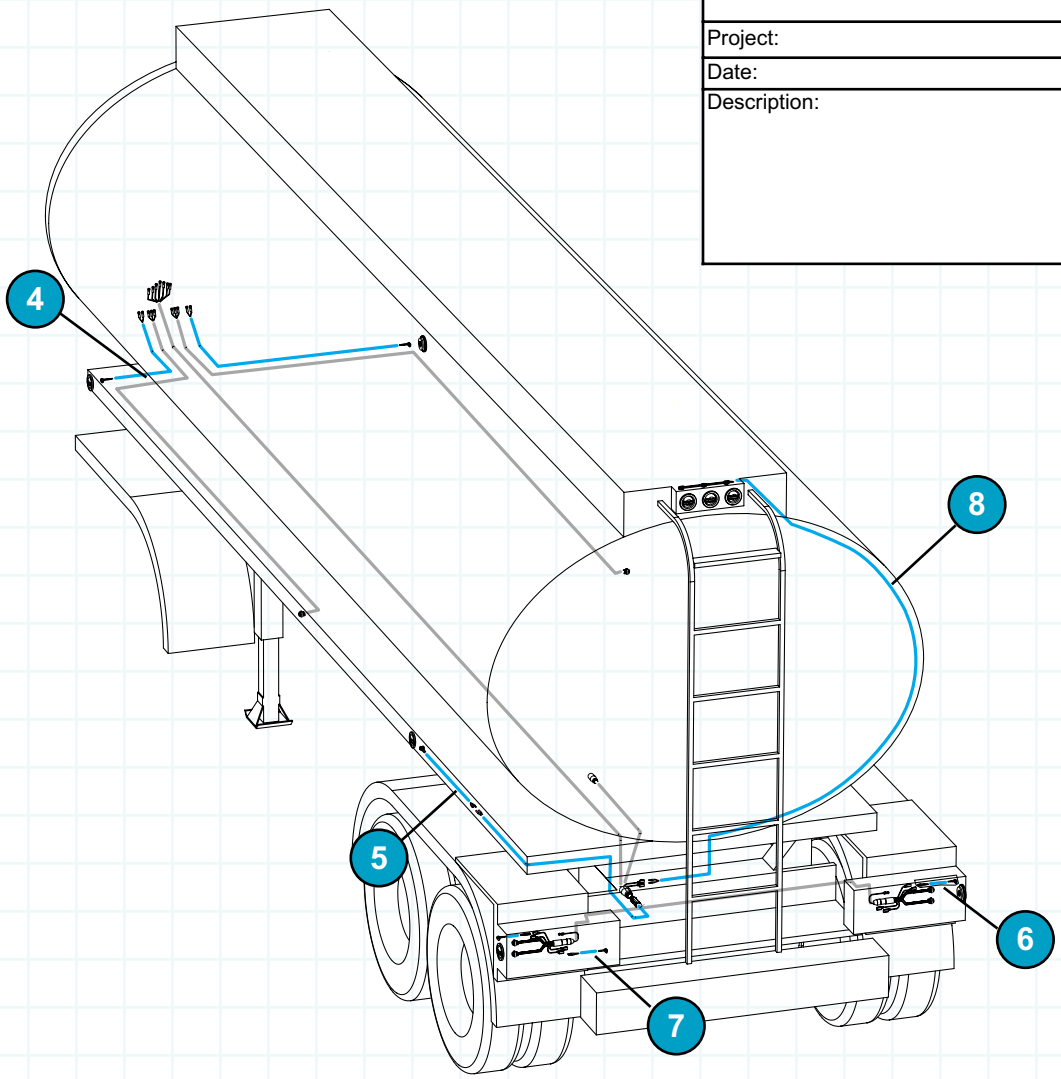
Description:




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 1 Forward Main Harness | | | |
| 2 Mid-Turn Harness | | | |
| 3 Rear Sill Harness | | | |

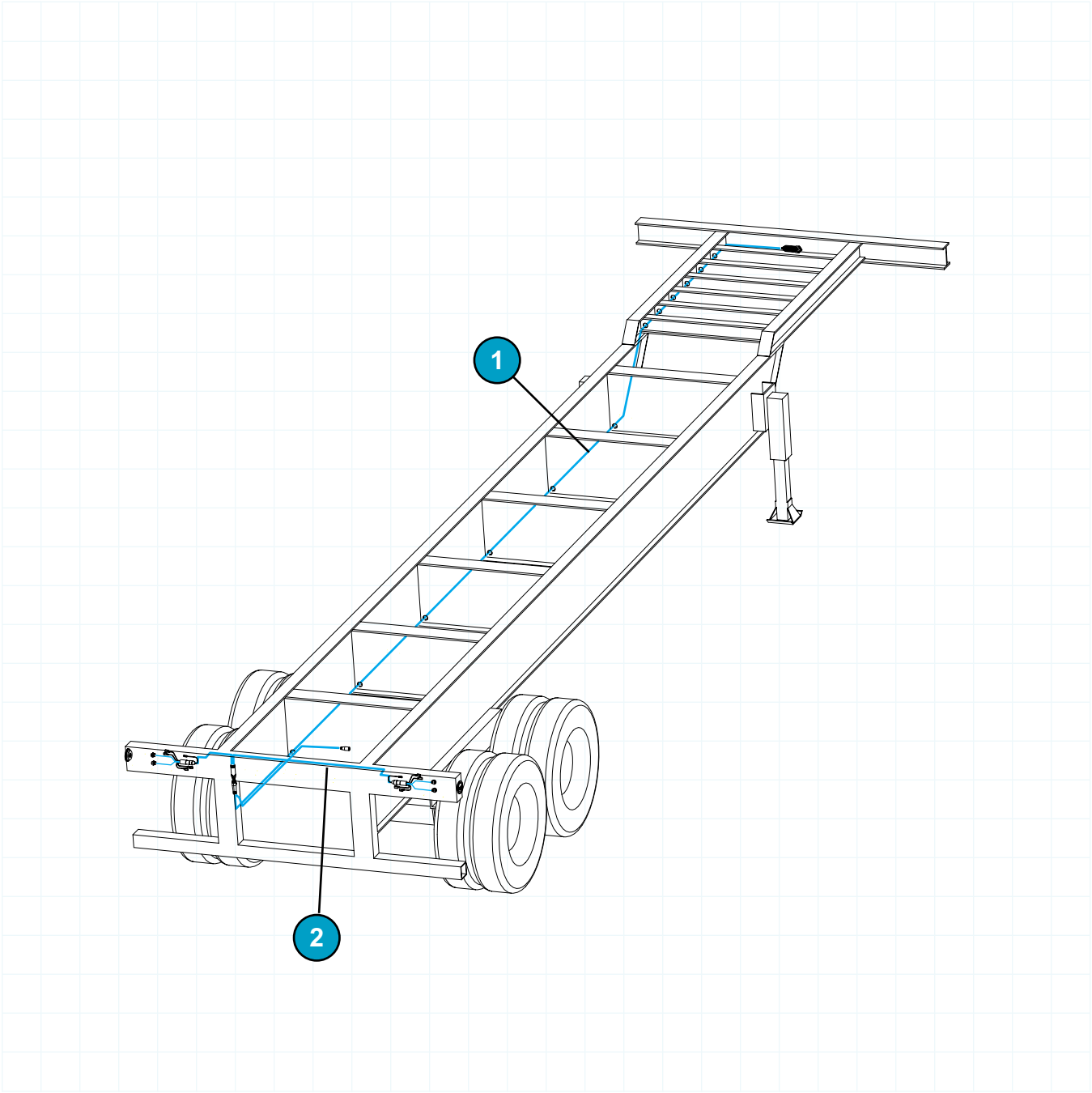
# 53’ Tanker Trailer - Marker Harness

| WORKSHEET (2 of 2) |
|---|
| Project: |
| Date: |
| Description: |




| | Harness | Quantity | Comments | Part # |
|---|---|---|---|---|
| 4 | Front Marker | | | |
| 5 | ABS Fault Lamp | | | |
| 6 | Rear Marker | | | |
| 7 | License Lamp | | | |
| 8 | Rear I.D. | | | |

# 28’ Container Chassis - Main and Rear Sill Harness




| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 1 | Main Harness | From the nosebox to the rear of the trailer | 01-6670-L4 |
| 2 | Rear Sill Harness | Power connection for rear tail and marker lamps. | 01-6758-87 |

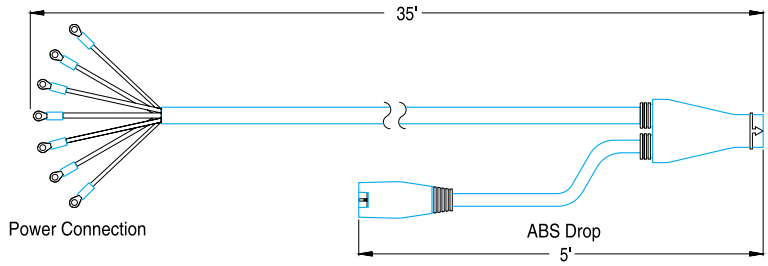
# 28’ Container Chassis - Main and Rear Sill Harness Options

**NOTE: The parts highlighted in light blue are recommended by Grote.**

## 1 Main Harness

| Part # | Power Connection | Wire Ga. |
|---|---|---|
| **01-6670-L4*** | **Nose Box** | **8/10/10/12 x 4** |
| 01-6670-L5 | Ring Terminals | 8/10/10/12 x 4 |

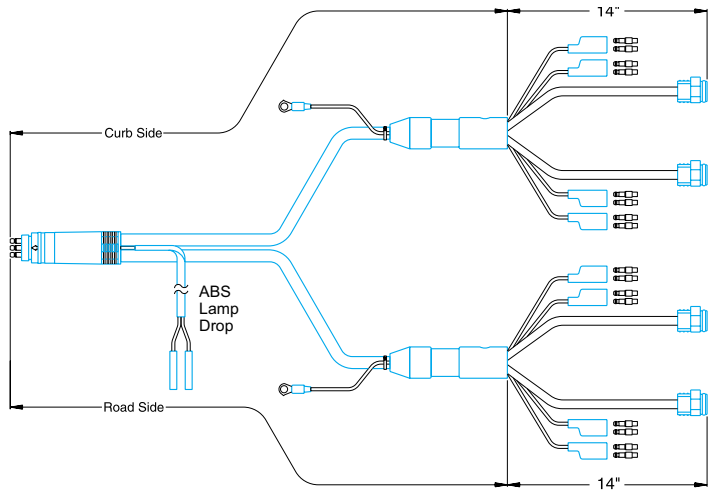
*Recommended Part Illustrated below




## 2 Rear Sill Harness

| Part # | Lamp Plug “A” | Curb Side | Road Side | ABS Drop |
|---|---|---|---|---|
| 01-6757-78 | Female Pin | 60" | 50" | 52" |
| 01-6757-79** | Female Pin | 89" | 16" | 18" |
| 01-6758-86 | Male Pin | 60" | 50" | 52" |
| **01-6758-87*** | **Male Pin** | **89"** | **16"** | **18"** |

*Recommended Part Illustrated below **Offset Rear Sill




## Connection Options

(See also page 6)

**Straight Male Pin**

**90º Male Pin**

**Female Pin**

**Nose Box**

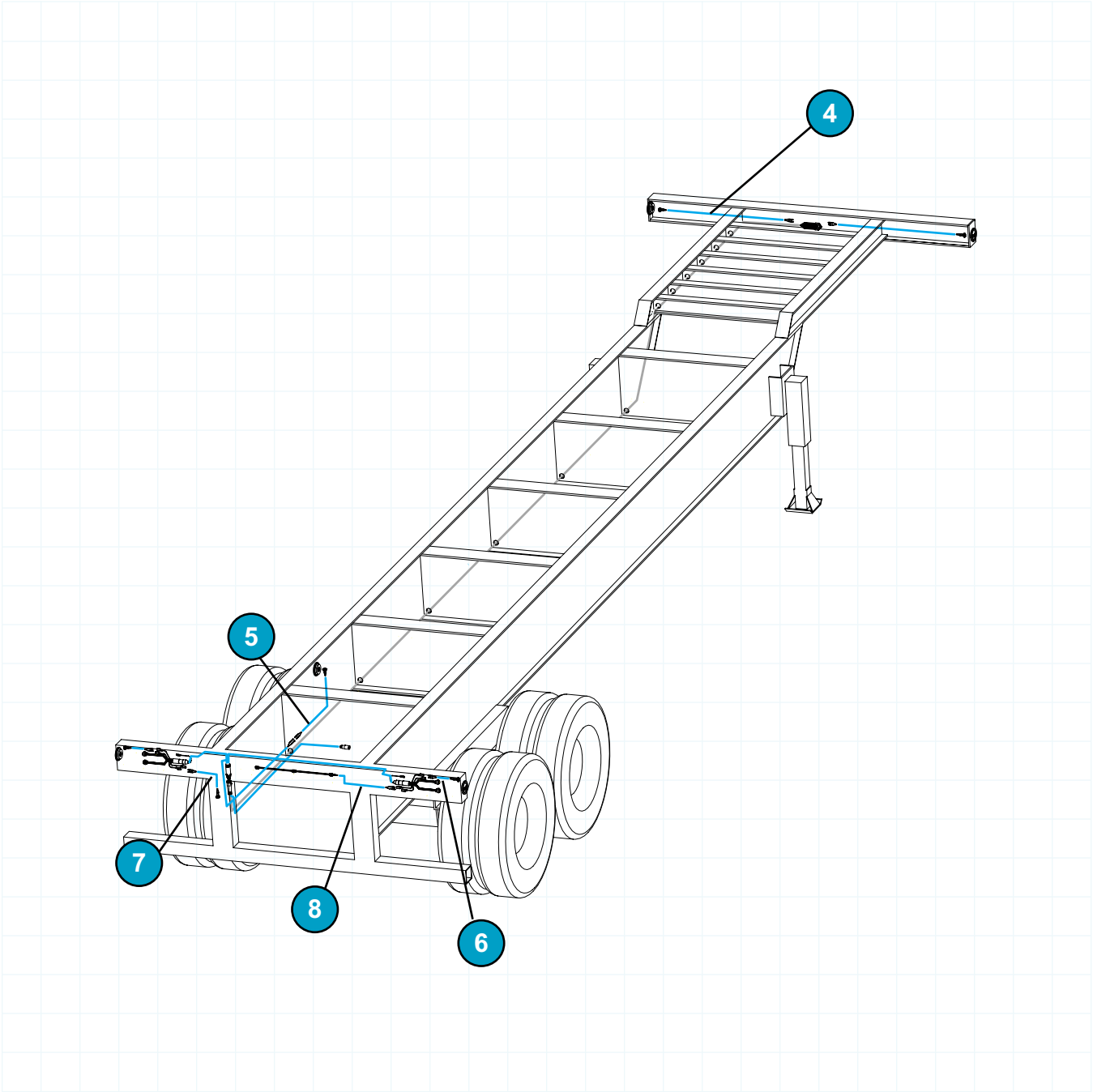
**1/4” Molded Ring Terminal (For Rear Sill) (Redundant Ground)**

**Standard #10 Ring Terminal**

| Gauge Chart |
|---|
| **10/12 x 6** |
| **10- White (Ground)** |
| **All others 12 gauge** |

| Gauge Chart |
|---|
| **8/10/10/12 x 4** |
| **8- White (Ground)** |
| **10- Red & Blue** |
| **All others 12 gauge** |

# 28’ Container Chassis - Marker Harness

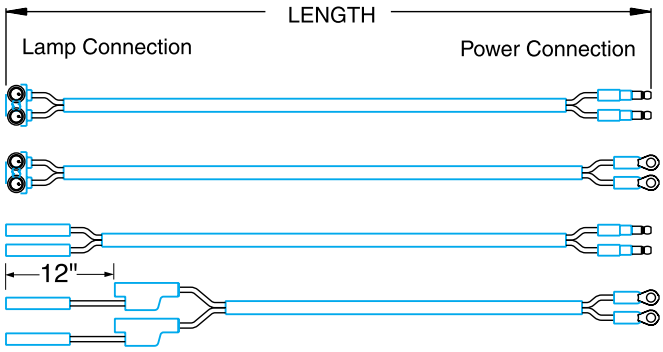



| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 4 | Front Marker | Two Required. Connect to front receptacle. | 01-3600-C2 (Roadside)<br>01-3600-A7 (Curbside) |
| 5 | ABS Fault Lamp | One Required | 05-2001-34 |
| 6 | Rear Marker | Two Required | 01-6707-A9 |
| 7 | License Lamp | One Required | 01-6622-12 |
| 8 | Rear I.D. | One Required | 01-6707-C2 |

# 28’ Container Chassis - Marker Lamp Harness Options

## 4 Front Marker Harness

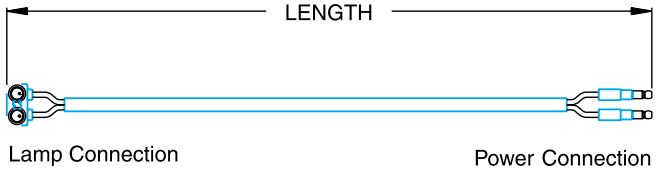
| Part # | Length | Lamp Connection | Power Connection | Side |
|---|---|---|---|---|
| **01-3600-C2**** | **48"** | **Marker lamp plug** | **.180 Slim-line Male** | **Road** |
| **01-3600-A7**** | **96"** | **Marker lamp plug** | **.180 Slim-line Male** | **Curb** |
| 01-3600-C3** | 48" | Marker lamp plug | Ring Terminal | Road |
| 01-3600-A9** | 96" | Marker lamp plug | Ring Terminal | Curb |
| 01-6620-E9** | 48 | .180 Slim-line Female | .180 Slim-line Male | Road |
| 01-6622-22** | 96" | .180 Slim-line Female | .180 Slim-line Male | Curb |
| 01-6620-F1 | 48" | .180 Slim-line Female | Ring Terminal | Road |
| 01-6620-C8 | 96" | .180 Slim-line Female | Ring Terminal | Curb |
| 01-6620-F2 | 48" | .180 Slim-line Female Flo-Thru | .180 Slim-line Male | Road |
| 01-6621-C1 | 96" | .180 Slim-line Female Flo-Thru | .180 Slim-line Male | Curb |
| 01-6620-F3** | 48" | .180 Slim-line Female Flo-Thru | Ring Terminal | Road |
| 01-6621-C3** | 96" | .180 Slim-line Female Flo-Thru | Ring Terminal | Curb |




**Flo-thru for two corner lamps per side

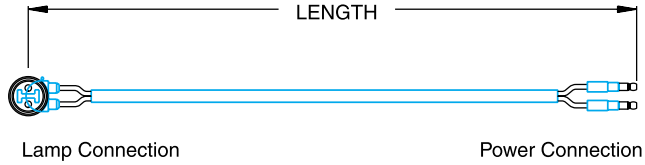
## 5 ABS Fault Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 01-3600-A6 | 60" | Marker lamp plug | .180 Slim-line Male |
| **05-2001-34*** | **72"** | **Marker lamp plug** | **.180 Slim-line Male** |
| 01-6622-12 | 60" | .180 Slim-line Female | .180 Slim-line Male |
| 01-6620-D1 | 72" | .180 Slim-line Female | .180 Slim-line Male |



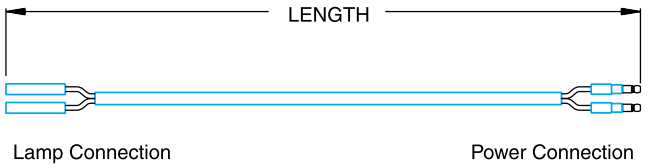

## 6 Rear Marker Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 05-2006-21 | 24" | Marker lamp plug | .180 Slim-line Male |
| **01-6707-A9*** | **24"** | **Turtleback II** | **.180 Slim-line Male** |
| 01-6693-74 | 24" | Thinline LED | .180 Slim-line Male |
| 05-2018-47 | 24" | .180 Slim-line Female | .180 Slim-line Male |



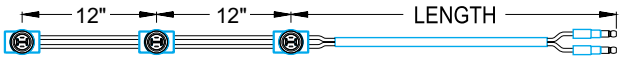

## 7 License Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-6622-12*** | **60"** | **.180 Slim-line Female** | **.180 Slim-line Male** |
| 01-6707-C1 | 60" | Turtleback II | .180 Slim-line Male |
| 01-6698-77 | 60" | Series 19 | .180 Slim-line Male |




## 8 Rear I.D. Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| 01-6707-C2 | 36" | Turtleback II | .180 Slim-line Male |
| **01-6693-22*** | **36"** | **Thinline LED** | **.180 Slim-line Male** |
| 01-3651-E3 | 36" | Marker lamp plug | .180 Slim-line Male |
| 01-6621-C7 | 36" | .180 Slim-line Female | .180 Slim-line Male |



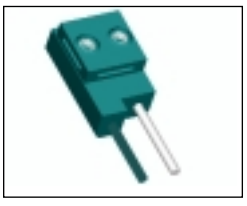

*Part Illustrated

## Connection Options

(See also page 6)

**Turtleback II**

**Thin Line & 3” LED**

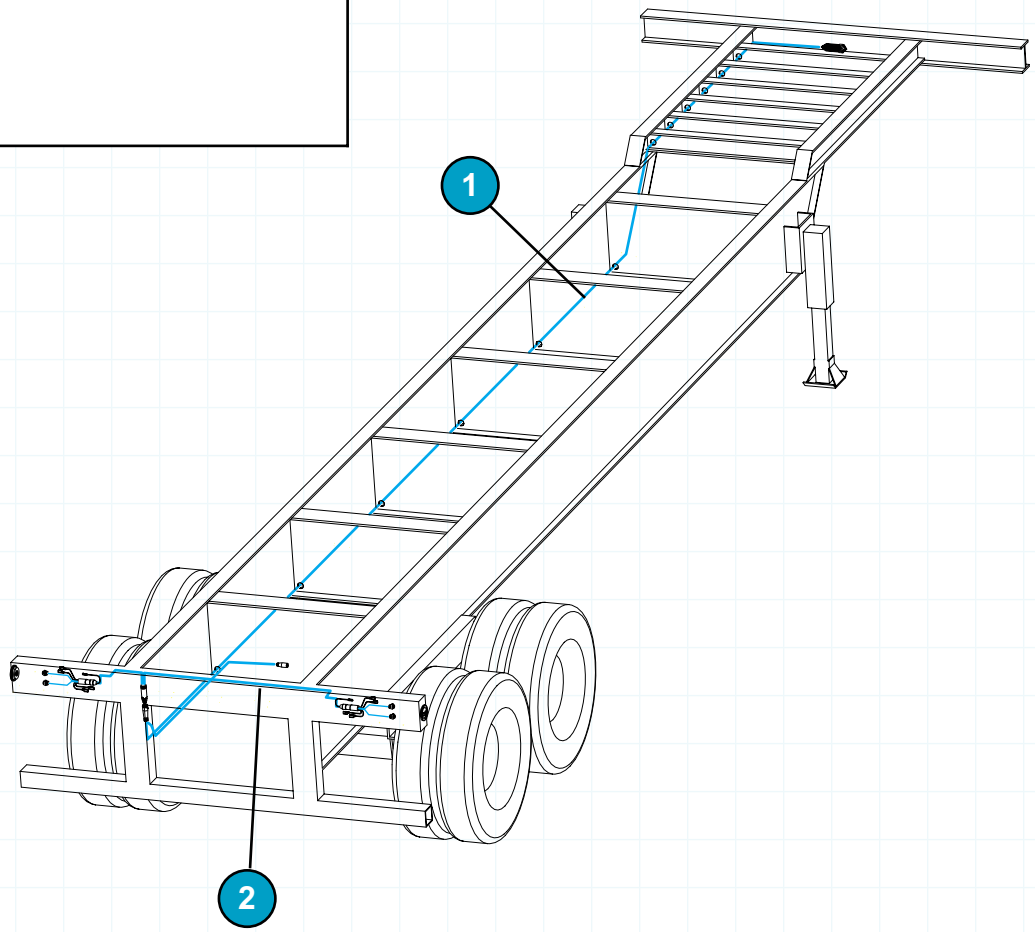


**Series 19**

**Marker Lamp Plug**

# Container Chassis - Main and Rear Sill Harness

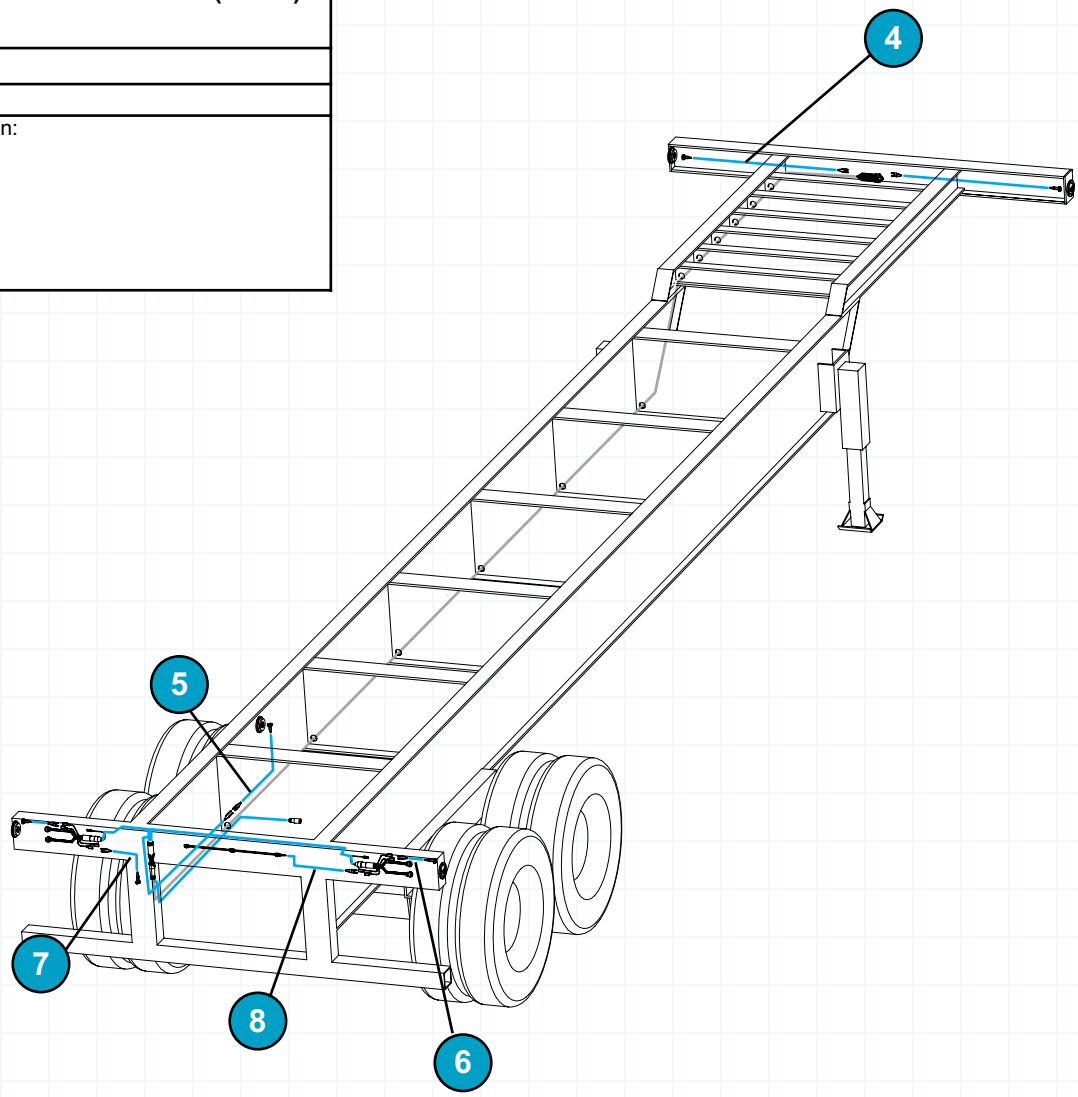
| WORKSHEET (1 of 2) |
|---|
| Project: |
| Date: |
| Description: |




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 1 Main Harness | | | |
| 2 Rear Sill Harness | | | |

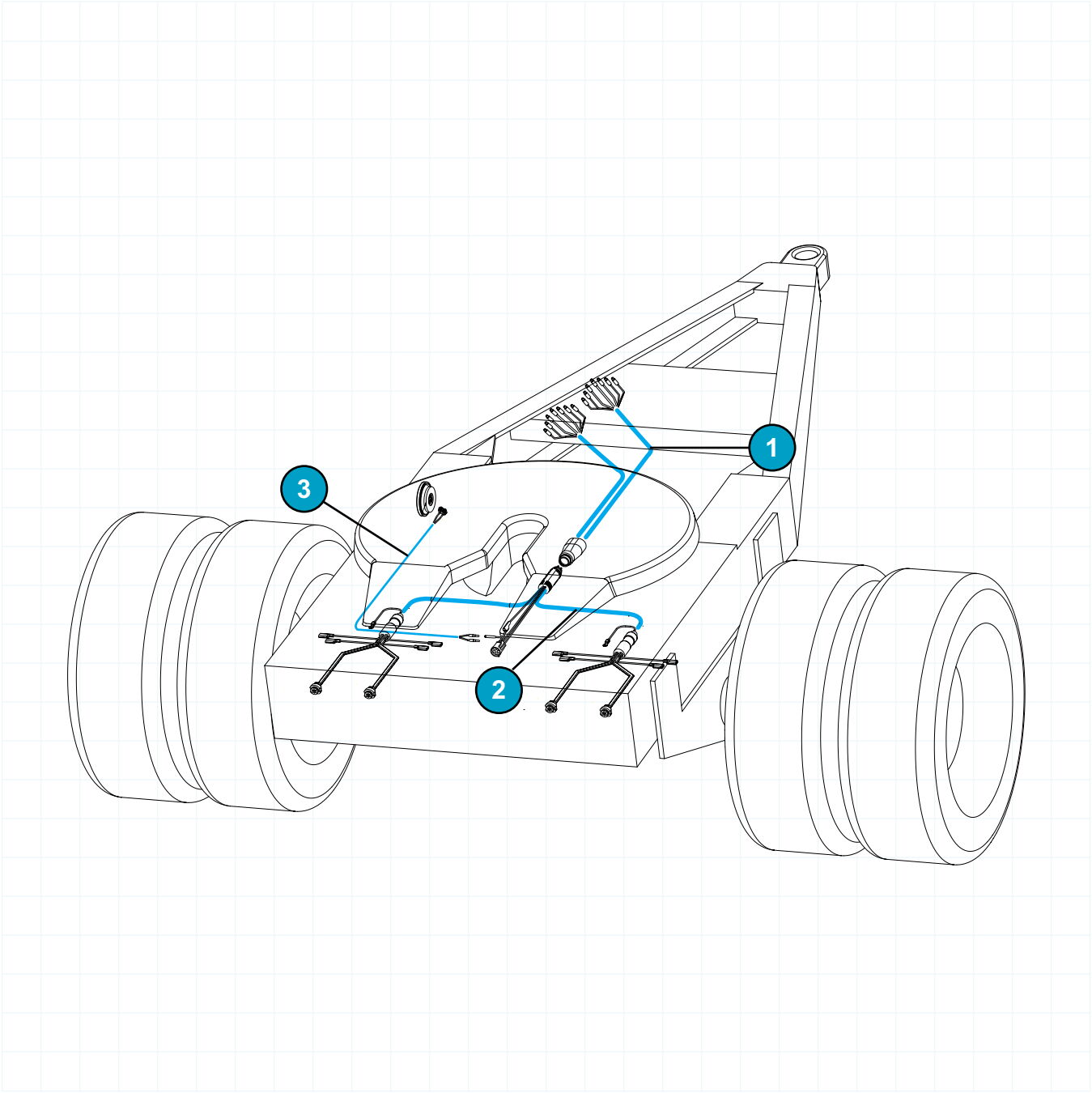
# Container Chassis - Marker Harness

| WORKSHEET (2 of 2) |
|---|
| Project: |
| Date: |
| Description: |




| | Harness | Quantity | Comments | Part # |
|---|---|---|---|---|
| 4 | Front Marker | | | |
| 5 | ABS Fault Lamp | | | |
| 6 | Rear Marker | | | |
| 7 | License Lamp | | | |
| 8 | Rear I.D. | | | |

# Dolly Chassis - Main and Rear Sill Harness




| | Harness | Comments | Recommended Part # |
|---|---|---|---|
| 1 | Doubles Main Harness | Main harness connects to both receptacles. | 01-6670-K4 |
| 2 | ABS Fault Lamp Harness | From the middle of the trailer to the rear sill. | 01-6758-A1 |
| 3 | Rear Sill Harness | Power connection for rear tail and marker lamps. | 01-3600-A6 |
| 4 | License Lamp Harness (Optional) | Power connection for rear tail and marker lamps. | 66910 |

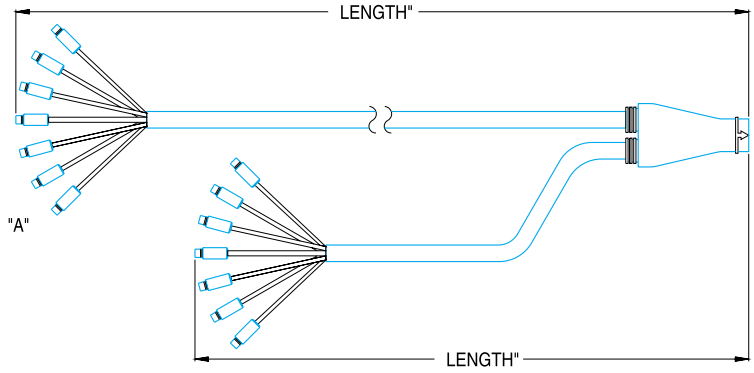
# Dolly Chassis - Main and Rear Sill Harness Options

**NOTE: The parts highlighted in light blue are recommended by Grote.**

## 1 Main Harness

| Part # | Length | Wire Ga. |
|---|---|---|
| **01-6670-K4*** | **78"** | **8/10/10/12 x 4** |
| 01-6670-H5 | 90" | 8/10/10/12 x 4 |

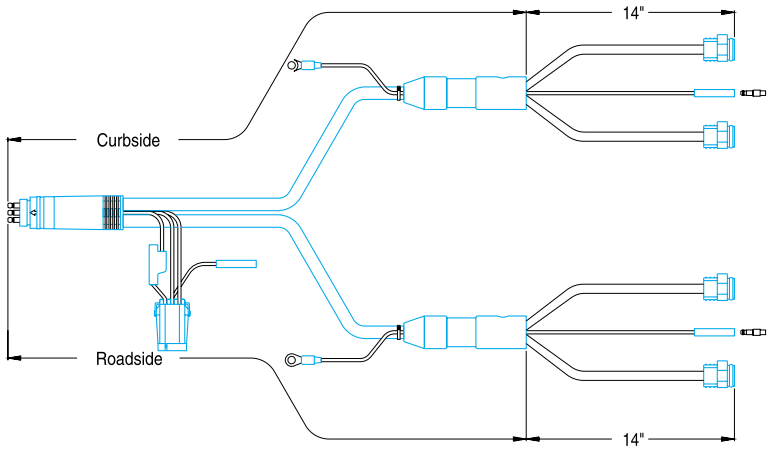
*Recommended Part Illustrated below




## 2 Rear Sill Harness

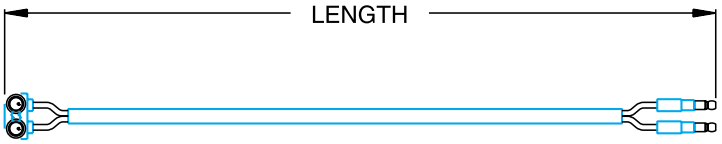
| Part # | Lamp Plug "A" | Curb Side | Road Side | ABS Drop |
|---|---|---|---|---|
| 01-6757-94 | Female Pin | 52" | 52" | 12" |
| **01-6758-A1*** | **Male Pin** | **52"** | **52"** | **12"** |

*Recommended Part Illustrated below




## 3 ABS Fault Lamp Harness

| Part # | Length | Lamp Connection | Power Connection |
|---|---|---|---|
| **01-3600-A6** | **60"** | **Marker lamp plug** | **.180 Slim-line Male** |
| 01-6622-12 | 60" | .180 Slim-line Female | .180 Slim-line Male |




Lamp Connection

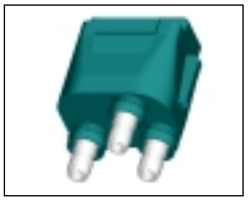
Power Connection

## Connection Options

(See also page 6)

**Straight Male Pin**

**90º Male Pin**



**Female Pin**

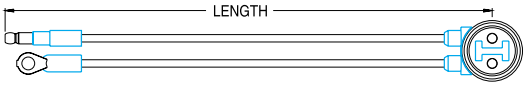
**Nose Box**

**1/4" Molded Ring Terminal (For Rear Sill) (Redundant Ground)**

**Standard #10 Ring Terminal**

## 4 License Lamp (optional)

| Part # | Lamp Length | Power Connection | Connection |
|---|---|---|---|
| **66910** | **6"** | **Turtleback II** | **.180 Slim-line Male** |
| 66980 | 6" | Series 19 | .180 Slim-line Male |
| 66850 | 6" | Marker lamp plug | .180 Slim-line Male |



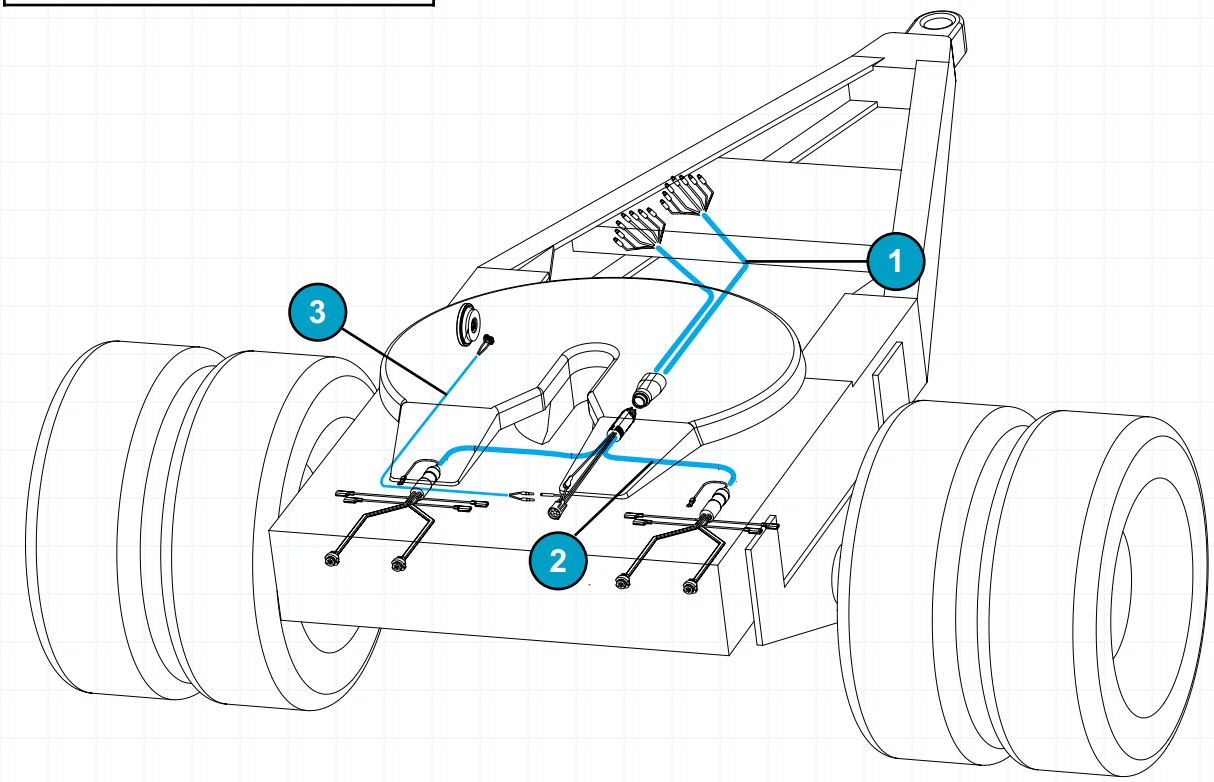

Chassis Ground

## Gauge Chart

| 8/10/10/12 x 4 |
|---|
| 8- White (Ground) |
| 10- Red & Blue |
| All others 12 gauge |

# Dolly Chassis - Main and Rear Sill Harness

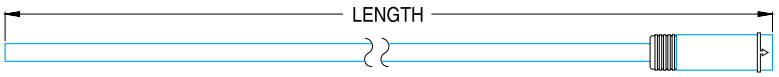
| WORKSHEET (1 of 1) |
|---|
| Project: |
| Date: |
| Description: |




| Harness | Quantity | Comments | Part # |
|---|---|---|---|
| 1 Doubles Main Harness | | | |
| 2 ABS Fault Lamp Harness | | | |
| 3 Rear Sill Harness | | | |
| 4 License Lamp Harness (Optional) | | | |

## Main Harness

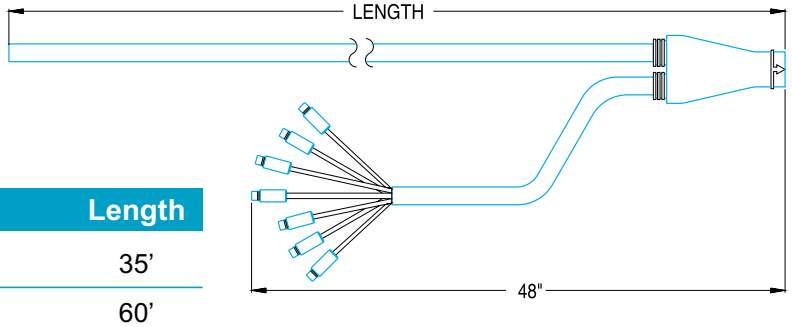
Extends from front of trailer (nosebox or receptacle), and provides sealed plug-in connection to rear sill harness.




| Part # | Wire Sizes | Length |
|---|---|---|
| **66080** | (1-10 gauge, 6-12 gauge) | 35’ |
| **66070** | (1-10 gauge, 6-12 gauge) | 60’ |
| **66081** | (1-8 gauge, 2-10 gauge, 4-12 gauge) | 35’ |
| **66071** | (1-8 gauge, 2-10 gauge, 4-12 gauge) | 60’ |

## Main Harness with 48-inch Drop-Out for Double Trailer Connection

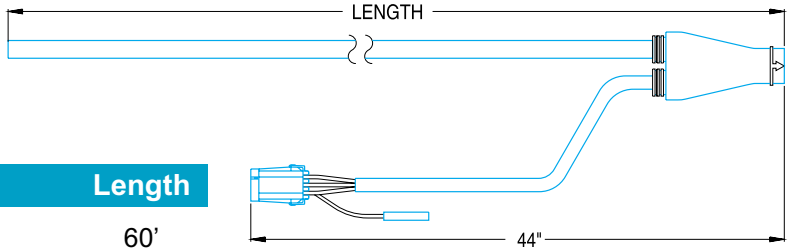
Provides sealed plug-in connection to rear sill harness. Drop out extends to receptacle at rear of trailer. Blunt-cut, 7-conductor cable. **Only use with LED lighting.**




| Part # | Wire Sizes | Length |
|---|---|---|
| **66710** | (1-10 gauge, 6-12 gauge) | 35’ |
| **66310** | (1-10 gauge, 6-12 gauge) | 60’ |
| **66711** | (1-8 gauge, 2-10 gauge, 4-12 gauge) | 35’ |
| **66311** | (1-8 gauge, 2-10 gauge, 4-12 gauge) | 60’ |

## Main Harness with 44-inch ABS Drop Out

Provides sealed plug in connection to rear sill harness. Drop out extends to ABS universal connector. Blunt cut, 7-conductor cable

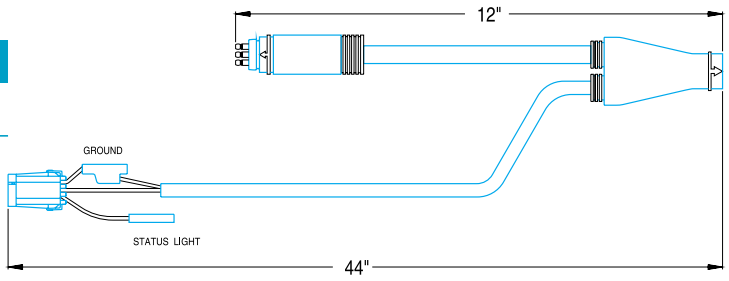



| Part # | Wire Sizes | Length |
|---|---|---|
| **66701** | (1-10 gauge, 6-12 gauge) | 60’ |
| **66702** | (1-8 gauge, 2-10 gauge, 4-12 gauge) | 35’ |

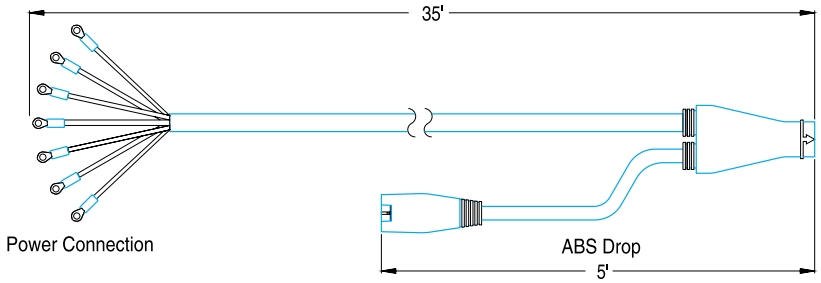
## ABS Adapter Main Harness

Junction between main harness and rear sill harness. Provides sealed plug in connection and a drop-out extension for ABS.

| Part # | Details | Length |
|---|---|---|
| **66705** | ABS Fault Light | 12” |

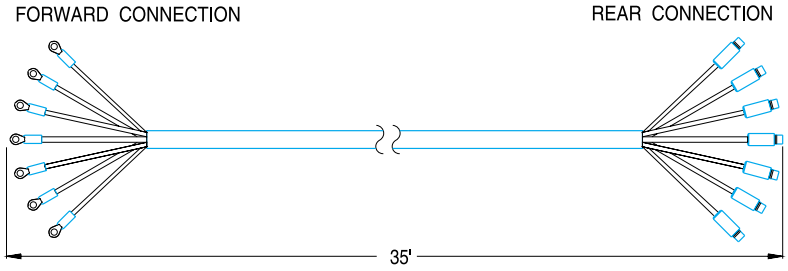


## Main Harness



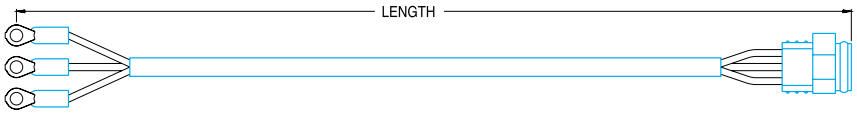

| Part # | Power Connection | Wire Ga. |
|---|---|---|
| **01-6670-L4** | Nose Box | 10/12 x 6 |
| **01-6670-L5** | Ring Terminals | 8/10/10/4 x 12 |

## Parallel Main Harness (for second trailer option)




| Part # | Forward Connection | Rear Connection | Wire Ga. |
|---|---|---|---|
| **01-6661-A1** | Nose Box | Nose Box | 8/10/10/4 x 12 |
| **01-6660-K3** | Ring Terminals | Nose Box | 8/10/10/4 x 12 |

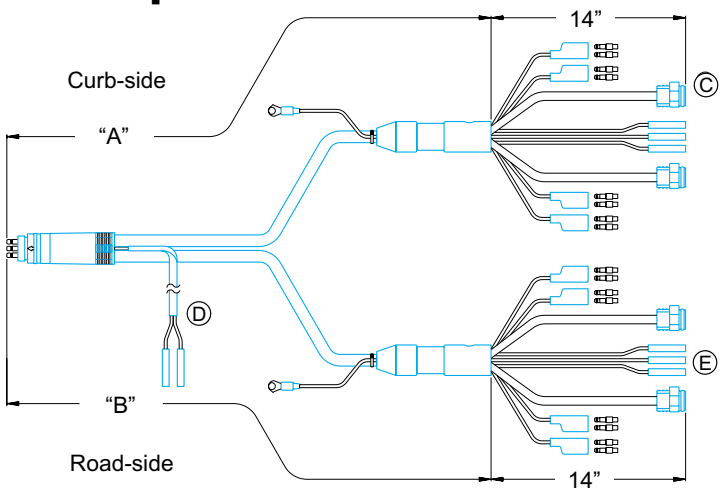
## Mid-turn Harness*




| Part # | Length | Power Connection | Lamp Connection | Side |
|---|---|---|---|---|
| **01-6681-T5** | 320" | Ring Terminals | Male Pin | Road |
| **01-6681-T4** | 320" | Ring Terminals | Male Pin | Curb |
| **01-6681-U4** | 318" | Ring Terminals | Female Pin | Road |
| **01-6681-U3** | 372" | Ring Terminals | Female Pin | Curb |

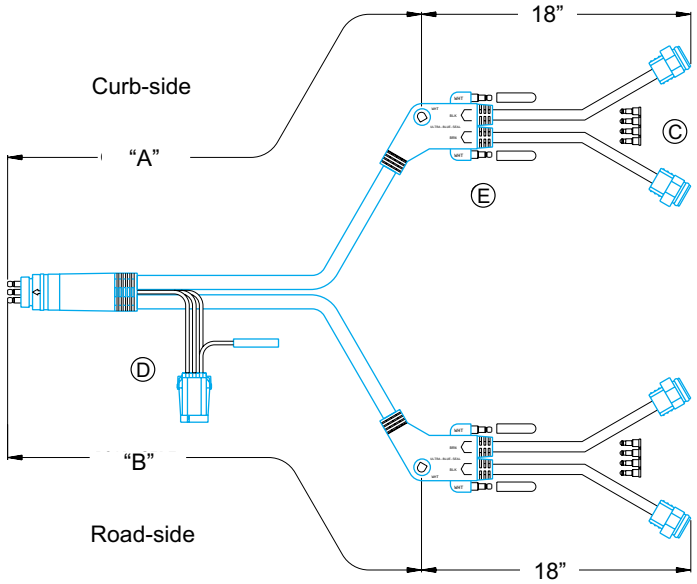
*Two required, one road side and one curb side.

# Rear Sill Options




**“Straight Through” Version**

| Part # | ”A” | “B” | Plug “C” | Opt. “D” | Opt. “E” |
|---|---|---|---|---|---|
| 01-6758-86 | 60” | 50” | Male-pin | ABS Fault-lamp | None |
| 01-6758-87 | 89” | 16” | Male-pin | ABS Fault-lamp | None |
| 01-6758-D9 | 52” | 52” | Male-pin | None | None |
| 01-6758-82 | 60” | 50” | Male-pin | ABS Fault-lamp | 6-Lamp |
| 01-6758-E1 | 52” | 52” | Male-pin | ABS Fault-lamp | Side-turn |
| 01-6758-E2 | 52” | 52” | Male-pin 90º | ABS Fault-lamp | None |
| 01-6758-E3 | 52” | 52” | Male-pin 90º | None | None |
| 01-6757-78 | 60” | 50” | Female-pin | ABS Fault-lamp | None |
| 01-6757-79 | 89” | 16” | Female-pin | ABS Fault-lamp | None |
| 01-6757-89 | 52” | 52” | Female-pin | None | None |
| 01-6760-70 | 60” | 50” | Hardshell | ABS Fault-lamp | None |




**“Elbow” Version**

| Part # | ”A” | “B” | Plug “C” | Opt. “D” | Opt. “E” |
|---|---|---|---|---|---|
| 01-6752-42 | 52” | 52” | Male-pin | ABS Conn. | Grd. Return |
| 01-6752-90 | 52” | 52” | Male-pin | ABS Conn. | Side-turn |
| 01-6752-12 | 52” | 52” | Male-pin | Blue Drop | Grd. Return |
| 01-6600-42 | 52” | 52” | Female-pin | ABS Conn. | Grd. Return |
| 01-6600-22 | 52” | 52” | Female-pin | Blue Drop | Grd. Return |

## Plug Options “C”

**Straight-in for Male-pin lamp applications**

**90º for Male-pin lamp applications. Used in areas with limited thickness**

**Standard 3-way plug for Female-pin lamp applications**

**Hardshell Connector**

## Key To Options:

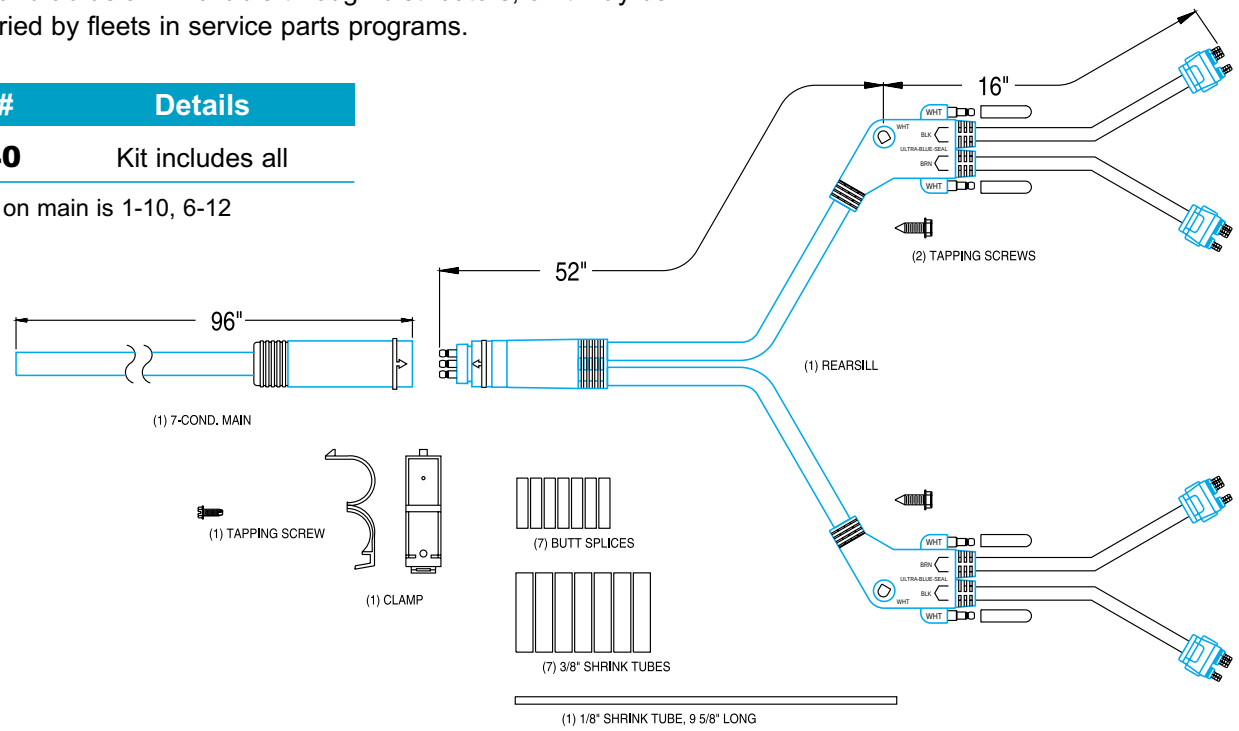
- “A” - is curbside.
- “B” - is roadside.
- “C” - See Plug Options chart above
- “D” - Options includes “ABS” hook-up, 2-cond. signal drop for “ABS” fault from main, or no drop.
- “E” - Option offered for 6-lamp or side-turn on “Straight Through” version. Auxiliary ground and side-turn on “Elbow”.

# Complete Rear Sill Harness Repair Kit

For retrofit or repair after rear end collision, permits one-man field installation in as little as 27 minutes. Proven since 1981. All connections weather-sealed by simple, foolproof UBS plugs. Entire harness double jacketed for extra armor against road-splash and abrasion. Available through distributors, or it may be inventoried by fleets in service parts programs.

| Part # | Details |
|---|---|
| **67040** | Kit includes all |

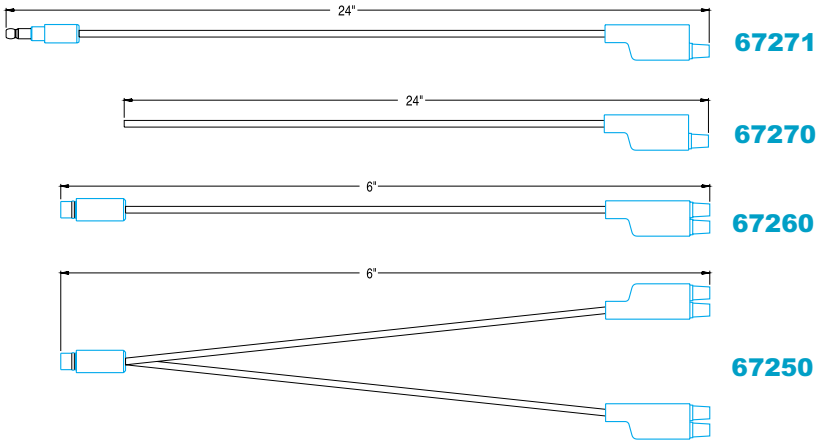
*Gauge on main is 1-10, 6-12




# Cut-To-Fit® Wire Harness System

The Cut-To-Fit® Wire Harness System adapts to the standard Grote Ultra-Blue-Seal rear sill and main harness. Part number 67271 (24" standard male to Cut-To-Fit® slim-line jumper) plugs into elbow style rear sill making a corrosion-proof connection. Your Cut-To-Fit® jumpers can be then plugged directly into the double slim-line plugs.

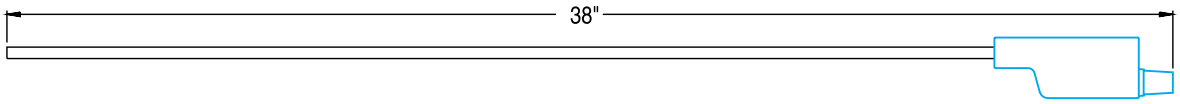
Cut-To-Fit® wire harness mates with the Grote seven pin receptacle (nose box) with the use of either the 67260 adapter or the 67250.




| Part # | Details |
|---|---|
| **67271** | Rear Sill Adapter |
| **67270** | Ground Return Adapter |
| **67260** | Nose Box Adapter |
| **67250** | Double Nose Box Adapter |

# Slim-Line Under-Lamp Females (Cut-To-Fit®)

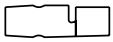
Abrasion-resistant double-jacketed wire lengths with molded-on slim-line under-lamp double females with sealing boot for crimp-on bullet connectors. Blunt cut, Cut-To-Fit®. All wires are black.

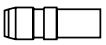



| Part # | Wire Size | Length |
|---|---|---|
| **67301** | 14-gauge | 3’ 2” (38”) |
| **67302** | 14-gauge | 6’ 8” (80”) |
| **67303** | 14-gauge | 14’ (168”) |
| **67304** | 14-gauge | 25’ 10” (310”) |
| **67305** | 14-gauge | 34’ 7” (415”) |
| **67400** | 12-gauge | 1’ 2” (14”) |
| **67401** | 12-gauge | 3’ 2” (38”) |
| **67402** | 12-gauge | 6’ 8” (80”) |
| **67403** | 12-gauge | 14’ (168”) |
| **67404** | 12-gauge | 25’ 10” (310”) |
| **67405** | 12-gauge | 34’ 7” (415”) |

## Crimp-On .180 Bullet Terminals

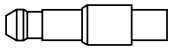
| Part # | Wire Size |
|---|---|
| **99500-3** | Field Service Terminal for 14-gauge Wire |
| **99501-3** | Field Service Terminal for 12-gauge Wire |


**99500-3**


**99501-3**

## Dummy Plug (for slim-line plugs)

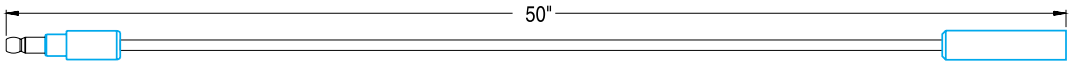
| Part # | Details |
|---|---|
| **99502** | All open plugs should be sealed with a dummy plug |


**99502**

# Lamp Jumper Harnesses

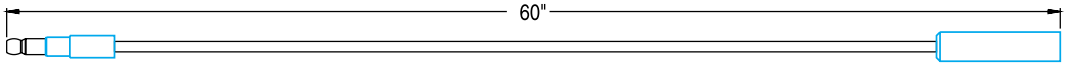
Provide connections to marker and license lamps through weatherproof UBS plugs. Plug directly into receptacles in the rear sill harness.

## Standard Male to Standard Female



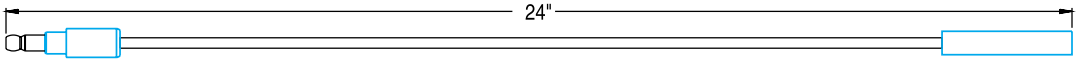

| Part # | Details | Length |
|---|---|---|
| **66100** | License lamp jumper (as shown) | 4’ 4” (50”) |
| **66101** | Intermediate turn signal jumper. Use with 66200 from front receptacle. | 28’ 3” (339”) |

## Slim-Line Under-Lamp Male to Standard Female



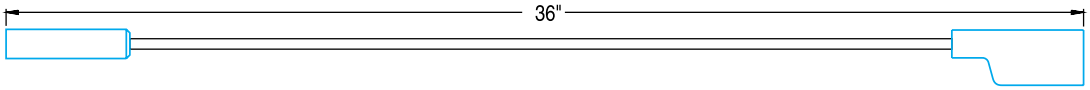

| Part # | Details | Length |
|---|---|---|
| **66110** | Jumper to access auxiliary drop-out on rear sill harness | 5’ (60”) |

## Standard Male to Slim-Line Under-Lamp Female



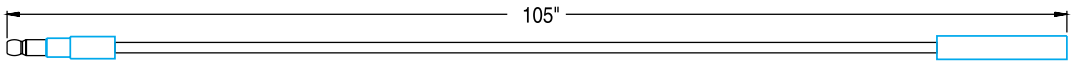

| Part # | Details | Length |
|---|---|---|
| **66170** | Rear tracking lamp jumper | 2’ (24”) |

## Standard Female to Double Slim-Line Under Lamp Female



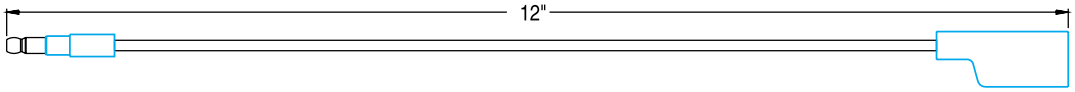

| Part # | Details | Length |
|---|---|---|
| **66225** | Ground jumper | 3’ (36”) |

## Slim-Line Under-Lamp Male to Slim-Line Under-Lamp Female



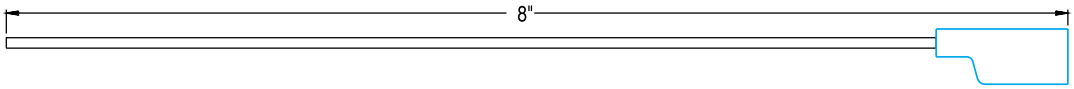

| Part # | Details | Length |
|---|---|---|
| **66162** | Intermediate side marker crossover jumper | 8’ 9” (105”) |

## Slim-Line Under-Lamp Male to Slim-Line Under-Lamp Female



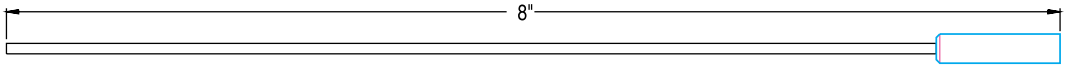

| Part # | Details | Length |
|---|---|---|
| **66160** | Multiple ID lamp jumper | 1’ (12”) |
| **66124** | Front marker and rear marker lamp jumper | 2’ 6” (30”) |
| **66161** | Front lower side marker from front receptacle. Use with 66190. | 4’ 7” (55”) |
| **66125** | Marker lamp jumper | 7’ (84”) |
| **66123** | Marker lamp jumper | 10’ 9” (129”) |
| **66163** | Front upper clearance/marker from front receptacle. Use with 66190 | 12’ 8” (152”) |
| **66122** | Marker lamp jumper | 16’ (192”) |
| **66113** | Clearance lamp jumper | 26’ 11” (323”) |

## Blunt Cut to Double Slim-Line Under-Lamp Female



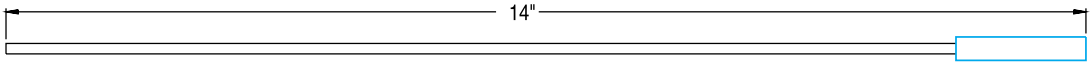

| Part # | Details | Length |
|---|---|---|
| **66190** | Wire into front receptacle terminals | 8” blunt cut |

## Blunt Cut to Standard Female



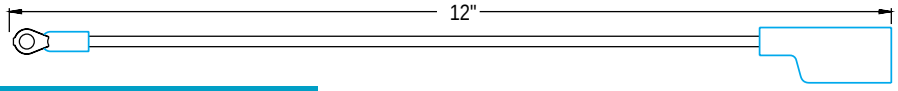

| Part # | Details | Length |
|---|---|---|
| **66200** | Wire into front receptacle terminals | 8” blunt cut |

## Blunt Cut to Slim-Line Under-Lamp Females



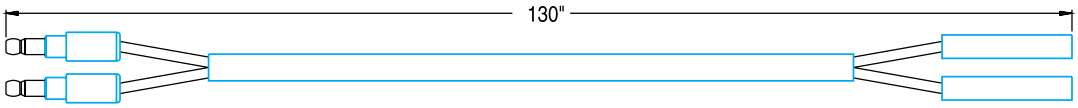

| Part # | Wire Size | Length |
|---|---|---|
| **67315** | 14-gauge | 1’ 2” (14”) |
| **67413** | 12-gauge | 1’ 2” (14”) |

## Double Slim-Line Female to Ring Terminal



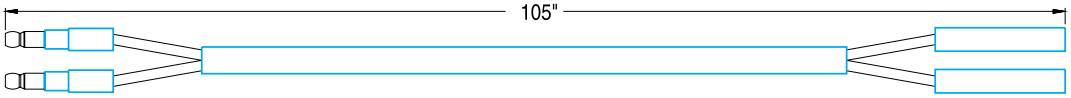

| Part # | Details | Length |
|---|---|---|
| **66210** | Jumper to accommodate insulated ground return system. Should be affixed to brass ground on rear sill harness. Crimp-on 1/4” ring terminal and heat shrink tube supplied unattached. | 12” |

## Two Standard Males to Two Slim-Line Under-Lamp Females



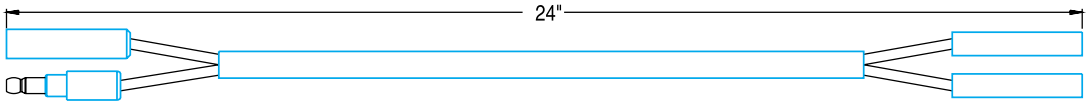

| Part # | Details | Length |
|---|---|---|
| **66220** | ID/auxiliary stop jumper. For use with 5306 combination clearance/marker and auxiliary stop/turn signal lamp. Use with 66400 when triple ID/Auxiliary stop is located on upper rail. | 10’ 10” (130”) |
| **66121** | Mid-turn & marker lamp harness | 30’ (360”) |
| **66104** | Mid-turn & marker lamp harness | 31’ 2” (374”) |

## Two Slim-Line Males to Two Slim-Line Under-Lamp Females




| Part # | Details | Length |
|---|---|---|
| **01-6620-E9** | Jumper | 4’ (48”) |
| **66221** | Marker lamp or ABS fault lamp | 5’ (60”) |
| **66222** | Jumper | 8’ (96”) |
| **66164** | Jumper | 8’ 9” (105”) |
| **05-2018-93** | Jumper | 12’ (144”) |

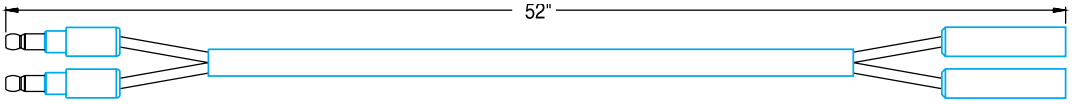
## Standard Male/Standard Female to Two Slim-Line Under-Lamp Females




| Part # | Details | Length |
|---|---|---|
| **66223** | Ground return tracking harness | 2’ (24”) |
| **66224** | Ground return tracking harness | 3’ (36”) |

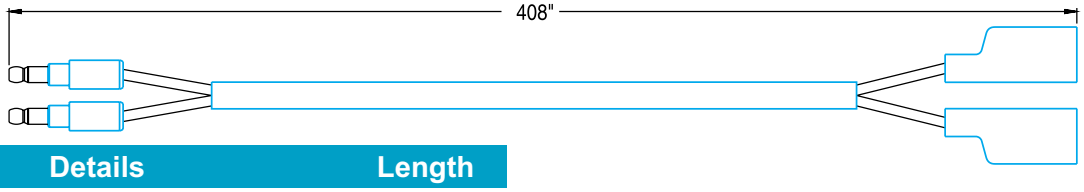
*Used with elbow style rear sill

## Two Standard Males to Two Standard Females



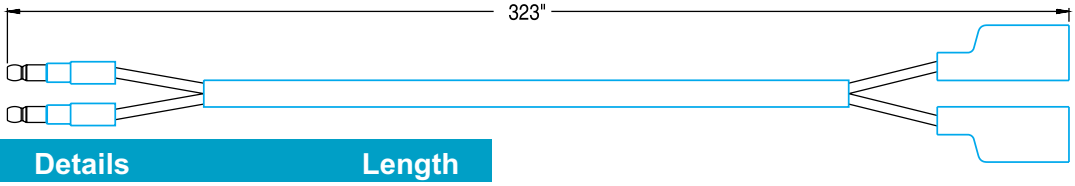

| Part # | Details | Length |
|---|---|---|
| **66133** | Marker lamp jumper | 4’ 4” (52”) |

## Two Standard Males to Two Double Females




| Part # | Details | Length |
|---|---|---|
| **66171** | Marker lamp jumper | 14’ (168”) |
| **66145** | Marker lamp jumper | 26’ (312”) |
| **66143** | Marker lamp jumper | 31’ (372”) |
| **66141** | Marker lamp jumper | 34’ (408”) |

## Two Slim-Line Male to Two Double Females




| Part # | Details | Length |
|---|---|---|
| **66165** | Marker lamp jumper | 1’ (12”) |
| **66155** | Marker lamp jumper | 2’ 6” (30”) |
| **66154** | Marker lamp jumper | 4’ 7” (55”) |
| **66153** | Marker lamp jumper | 7’ (84”) |
| **66152** | Marker lamp jumper | 10’ 9” (129”) |
| **66151** | Marker lamp jumper | 12’ 8” (152”) |
| **66150** | Marker lamp jumper | 16’ (192”) |
| **66135** | Marker lamp jumper | 26’ 11” (323”) |

## Wiring Kit for Vans

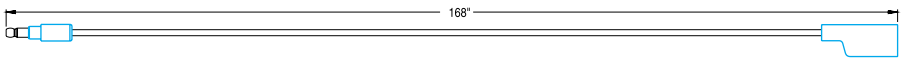
Contains all lamp jumper harnesses and pigtails to plug all rear lights into rear sill harness. (Elbow style)

| Part # | Details |
|---|---|
| **66510** | Kit for field re-sealable lamp system |

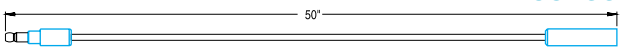
**Kit includes the following components:**

(1) **66100** For use as license lamp harness
(2) **66170** For use as tracking lamp harnesses
(1) **66180** For use as identification lamp harness
(2) **66160** For use as identification lamp extension harnesses (as shown)
(5) **67120** Lamp Pigtails for factory-sealed systems or for field re-sealable systems.

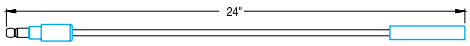
**66180**



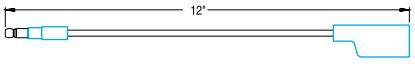

**66100**



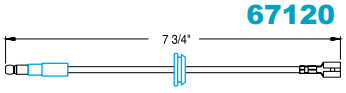

**66170**




**66160**




**67120**



# Notes

# Notes

# UBS Installation Tips & Shortcuts

After the proper lighting components have been determined and the required harnesses have been chosen, it's time to install the Grote UBS System. This section provides guidelines and pointers for fast, easy installation.

If this is a retrofit, remove and discard the existing wire harness system. Inspect the route that the harness will take for any sharp edges, obstacles and wear points and eliminate them or re-route the wire.

Install the forward main harness and route the cable from behind the fifth wheel plate forwards to the nose box. Pull the cable to the receptacle and allow about a foot of extra wire to help in installation.

At this time, make all connections at the nose box area. Pay close attention to color locations and match colors of wire to appropriate pinouts, which are identified by color name.

***TIP: If you are not replacing the nose box or receptacle, make sure that all the terminals are free of dirt and corrosion. Always inspect both sides of the receptacle for damaged or missing pins. Follow proper maintenance guidelines and apply grease on terminals where applicable.***

When choosing connectors Grote offers both standard and Slim-line versions. Slim-lines are typically used under lamp connections where space is limited. Both utilize 0.180 male and female terminals and are overmolded in UBS blue. They are designed with a smaller diameter and are "squared-off" where the wire exits the body. Standard connectors by comparison are slightly larger in diameter and round where the wire exits the body. Both designs are used for pigtails, jumpers, etc. in the UBS system with the Slim-line predominantly used with straight through rear sills and the standard typically found on the elbow style.

***TIP: Because of the similarity in size between standard and Slim-line connectors, the question often arises as to whether they are interchangeable. Although they can be plugged together, Grote recommends they not be interchanged. Even though the Slim-line male can plug into a standard female, the difference in diameters can allow moisture and contaminants to enter the connection. A standard male can plug into the Slim-line female and while the terminals may fit, in time, the larger diameter of the male will tear the female and allow moisture and contaminants to enter the terminal area defeating the UBS design. Using improper connections as described will limit and/or void the warranty.***

Make certain that a generous amount of dielectric sealant is applied to the terminal area.

***TIP: All Grote UBS female plugs are pre-greased at the factory.***

If the installation calls for ring terminals at this connection, use a sealable nose box to reduce the risk of corrosion.

***TIP: When wire connections are complete, do not re-install the nose box. Leave it loose until after the installation is complete and the wire system has been tested.***

Route the main cable towards the rear of the trailer, either through the cross members or above them (if applicable). When routing the cable, be sure to route it in locations that will not allow the cable to get pinched or cut due to moving parts or abrasion. Also, avoid routing wire where it will be subjected to excessive road splash and high pressure cleaning spray. If the harness cannot be routed through cross members and has to be routed under the members, assure that the cable is secure with Grote weather resistant nylon wire ties or clamps. While routing the main harness to the rear of the trailer, take into considerations special routing requirements such as sliding undercarriages.

If your main harness is designed with ABS main drops and side turn signal drops, route these cables to the proper locations and plug them in.

Plug the rear sill and the main harness together and route route these cables to the proper locations and plug.

***TIP: On some trailer applications the rear sill needs to be installed in a rear pan prior to making the connection to the main harness.***

Assemble the clamp (provided) to the main and rear sill connection and then pack with grease using the fitting on the side. This is not a "required" installation method, but it is highly recommended. Failure to do so could limit and/or void the warranty.

The rear sills are designed with female receptacles so sealed connections can be made and the need to cut and splice wires is eliminated.

Plug the lamp harness or pigtail for your rear marker lamps and route the cable to the rear sill. Remove the provided dummy plug and make your connection.

***TIP: It's important to always leave dummy plugs in female ports not being used to power lamps. This eliminates the risk of moisture or dirt getting into the plug.***

Follow this same approach when installing the license lamp and the rear identification cluster. Route the cable from the lamps to the rear sill. Excess wire can now be secured with wire ties.

***TIP: Always secure wires and cables and do not allow them to hang loose. Snow, ice and mud can build on wires and the extra weight can cause accidental disconnects. Also, don't route wires over rear tires since debris and blowouts could cause damage to exposed cables.***

While working at the rear of the trailer, make connections for the stop, tail and turn lamps to the rear sill harness. Tie and secure the wires to avoid chafing or rubbing in the light module. Attempt to keep the wires from resting in the bottom of the light module.

***TIP: Do not secure these lamps into the trailer until after installation test is complete.***

Finish plugging all plugs into lamps at the rear of the trailer and work your way forward. Connect the side turn lamps if not done already.

When at the front of the trailer you need to route the wires and make the connection for the front markers. It's recommended the wires be routed on the inside of the trailer and protected when possible. If not possible, route the wires in a manner that protects them from damage from causes such as impact with tree limbs.

If there are any additional marker lamp connections, make them now using the same procedures. Don't overload circuits when connecting extra marker lamps. Review the lamp information (amp draw) for proper power distribution.

Inspect the trailer once more, reviewing all plug and lamp connections. Make sure the installation procedure used the color-coded wires for the correct connections and that all wires and connections are secure. You should confirm that all connections are properly grounded and that no circuit (black and brown especially) has been over-loaded.

Connect a proper power supply to the nose box. Use a source such as a yard truck or a power supply with which you can control individual power output to the six color locations.

***TIP: Make sure you have a proper ground connection method.***

Grote offers both ground return and frame ground, but emphasizes the use of ground return. Though a frame ground system offers less voltage drop initially, in time improper grounding can cause excessive voltage drop due to corrosion. A ground return system offers a sealed, constant system. Grote's main and rear sills are always ground return, with the rear sill having a redundant frame ground.

Turn on the power to the tail and marker functions (black and brown) and make sure all marker lamps and tail lamps are illuminated. This would include license lamp and side marker.

Check your stop circuit (red) and then right (green) and left (yellow) turns. Make sure side turn signals are performing properly.

***The UBS system provides a modular solution for retrofit or new installation of lighting and wiring systems for trailers. The Plug and Go design offers un-paralleled ease of installation and superior protection against moisture and contaminants.***

# Bulb Chart

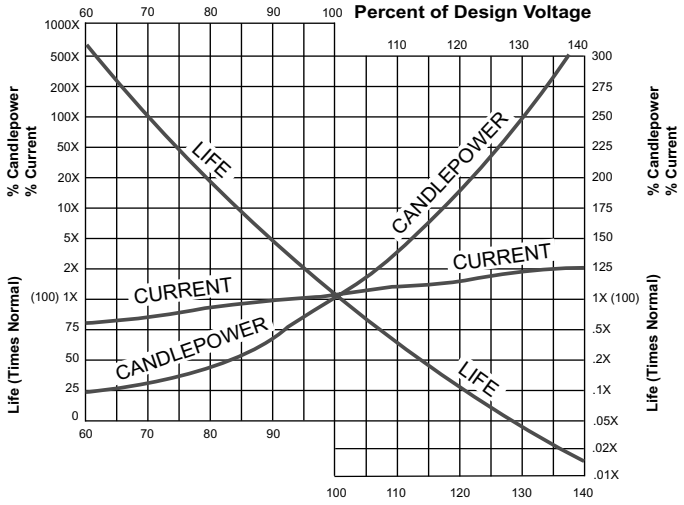
***Since today nearly all lamp sales are in 12-volt, distributors cannot afford to carry separate 6-volt inventories with the resultant poor turnover and inadequate return on investment. So since only a simple bulb change is necessary to convert a 12-volt to a 6-volt lamp, we supply you with this quick cross-reference chart instead of selling you inventory you can't afford. (Motorized Roto-Beacons require more than a simple bulb change, so Grote offers separate 24-volt models in addition to 12-volt)***

| Lamp Number | 6-Volt | Grote Standard 12-Volt | Candle Power | Fleet Service 12-Volt | Heavy Duty 12-Volt | Grote 24-Volt |
|---|---|---|---|---|---|---|
| 1606 | 63 | 67 | 4 | 97 | 1155 | |
| 1617, 1619 | 63 | 67 | 4 | 97 | 1155 | |
| 1622 | 63 | 67 | 4 | 97 | 1155 | |
| 4501, 4502, 4503 | 63 | 67 | 4 | 97 | 1155 | |
| 4512 | 63 | 67 | 4 | 97 | 1155 | |
| 4514 | | | 2 | | | 464E-1 |
| 4515 | | | 2 | | | 464E-1 |
| 4516 | | | 2 | | | 464E-1 |
| 4517 | 147 | 194 | 2 | 193 | 194 | |
| 4518 | | | 2 | | | 464E-1 |
| 4520, 4522 | | | 2 | | | 464E-1 |
| 4525 | 147 | 194 | 2 | 193 | 194 | |
| 4526 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 4533 | 63 | 67 | 4 | 97 | 1155 | |
| 4538, 4541 | 147 | 194 | 2 | 193 | 194 | |
| 4543, 4544, 4546 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 4550 | 147 | 194 | 2 | 193 | 194 | |
| 4551, 4552 | 147 | 194 | 2 | 193 | 194 | |
| 4566 | 55 | 1895 | 2 | 293 | 1895 | |
| 4567 | 147 | 194 | 2 | 193 | 194 | |
| 4571 | 55 | 1895 | 2 | 293 | 1895 | |
| 4593 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 4600 | 147 | 194 | 2 | 193 | 194 | |
| 4628 | 147 | 194 | 2 | 193 | 194 | |
| 4629 | 63 | 67 | 4 | 97 | 1155 | |
| 4630, 4631 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 4632 | 906 | 904 | 4 | | 904 | |
| 4633 | 147 | 194 | 2 | 193 | 194 | |
| 4639 | 55 | 1895 | 2 | 293 | 1895 | |
| 4643 | | 168 | 3 | | | |
| 4649 | 147 | 194 | 2 | 193 | 194 | |
| 4654 | 63 | 67 | 4 | 97 | 1155 | |
| 4670, 4671 | 147 | 194 | 2 | 193 | 194 | |
| 4677, 4578, 4679 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 4680 | 147 | 193 | 2 | 193 | 194 | |
| 4681 | | 168 | 3 | | | |
| 4682 | 906 | 904 | 4 | | 904 | |
| 4686 | 147 | 193 | 2 | 193 | 194 | |
| 4688 | 147 | 194 | 2 | 193 | 194 | |
| 4689 | 147 | 194 | 2 | 193 | 194 | |
| 4705 | | 1895 | | | | |
| 4807, 4827 | | 53 | 1 | | | |
| 4900 | 63 | 67 | 4 | 97 | 1155 | |
| 4904 | 147 | 194 | 2 | 193 | 194 | |
| 4906 | 147 | 194 | 2 | 193 | 194 | |
| 4907, 4908 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 4911 | 147 | 194 | 2 | 193 | 194 | |
| 4915 | | | 2 | | | 464E-1 |
| 5013 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5022, 5023, 5035, 5050 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5053, 5054 | 1154 & 55 | 1157 & 1895 | 32/3*2 | 198*293 | 1157*1895 | |
| 5063, 5064, 5065, 5066, 5067, 5076, 5085, 5086, 5087, 5088, 5089 | 1154 | 1157 | 32/3 | 198 | 1157 | |

| Grote Lamp Number | 6-Volt | Fleet Standard 12-Volt | Heavy Candle Power | Service 12-Volt | Duty 12-Volt | Grote 24-Volt |
|---|---|---|---|---|---|---|
| 5090, 5091, 5094, 5095, 5097, 5099, 5104, 5110, 5114, 5119 | 1129 & 1154 | 1156 & 1157 | 32*32/3 | 199*198 | 1156*1157 | |
| 5124 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5134, 5200, 5208 | 1129 & 1154 | 1156 & 1157 | 32*32/3 | 199*198 | 1156*1157 | |
| 5202, 5206 | | 3157 | 32/3 | | | |
| 5211, 5212 | 1129 & 1154 | 1156 & 1157 | 32*32/3 | 199*198 | 1156*1157 | |
| 5230, 5231 | 1154 & 55 | 1157 & 1895 | 32/3*2 | 198*293 | 1157*1895 | |
| 5236, 5237 | 1154 & 55 | 1157*1895 | 32/3*2 | 198*293 | 1157*1895 | |
| 5252 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5260 | 1129 & 1154 | 1156*1157 | 32*32/3 | 199*198 | 1156*1157 | |
| 5261 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5263, 5264 | 1154 & 55 | 1157*1895 | 32/3*2 | 198*293 | 1157*1895 | |
| 5273, 5275 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5280 | 1129 | 1156 | 32 | 199 | 1156 | |
| 5281 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5283 | 147 | 194 | 2 | 193 | 194 | |
| 5290, 5291, 5297 | 1129 & 1154 | 1156*1157 | 32*32/3 | 199*198 | 1156*1157 | |
| 5300, 5302, 5303, 5305 | 1154 | 1157 | 32/3 | 198 | 1157 | |
| 5313 | | 2057 | 32/2 | | | |
| 5370, 5371, 5372, 5376 | 1129 & 1154 | 1156*1157 | 32*32/3 | 199*198 | 1156*1157 | |
| 5378 | | 3157 & 1156 | 32/3 , 32 | | | |
| 5509, 5522, 5523, 5524, 5528, 5529 | 1129 | 1156 | 32 | 199 | 1156 | |
| 5534 | 1129 & 147 | 1156*194 | 32*2 | 199*193 | 1156*194 | |
| 5541, 5542, 5543, 5544, 5545, 5546, 5547 | 147 & 1129 | 1156*194 | 2*32 | 193*199 | 164*1156 | |
| 5553, 5555, 5561, 5600, 5602, 5603, 5604, 5605 | 1129 | 1156 | 32 | 199 | 1156 | |
| 5607, 5608 | 1129 | 1156 | 32 | 199 | 1156 | |
| 6000, 6001, 6008 | 63 | 67 | 4 | 97 | 1155 | |
| 6010 | 63 | 67 | 4 | 97 | 1155 | |
| 6012, 6013 | 63 | 67 | 4 | 97 | 1155 | |
| 6015 | 63 | 67 | 4 | 97 | 1155 | |
| 6025 | 63 | 67 | 4 | 97 | 1155 | |
| 6031 | 1129 | 1156 | 32 | 199 | 1156 | |
| 6035 | | 906 | 6 | | | |
| 6036 | | 1142 | 21 | | | |
| 6103 | 87 | 93 | 15 | | | |
| 6108 | 1888 | 1893 | 2 | 1893 | 1889 | |
| 6109, 6116 | 87 | 93 | 15 | | | |
| 6122 | 1154 | 1016 | 6/21 | 198 | 1016 | |
| 6130 | | 561*1816 | 12*3 | | 561*1816 | |
| 6137 | | Grote 92611 | | | | |
| 6149 | 1129 | 1156 | 32 | 199 | 1156 | |
| 6151 | | Grote 92901 | | | | |
| 6157 | | 1141 | 21 | | | |
| 6164, 6165, 6166, 6167 | | 1141 | 21 | | | |

| Grote Lamp Number | 6-Volt | Fleet Standard 12-Volt | Heavy Candle Power | Service 12-Volt | Duty 12-Volt | Grote 24-Volt |
|---|---|---|---|---|---|---|
| 6201, 6202, 6215, 6219, 6220 | 1129 | 1156 | 32 | 199 | 1156 | |
| 6229 | | 1141 | 21 | | | |
| 6300, 6306 | 1129 | 1156 | 32 | 199 | 1156 | |
| 6305 | 1129 | 1156 | 32 | 199 | 1156 | |
| 6308 | | 4413 | 1100 | | | |
| 6311, 6312, 6313 | | 886 | 95 | | | |
| 6314, 6315, 6316, 6317, 6318, 6319, 6320, 6321, 6322, 6323, 6329, 6330, 6331 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6324, 6325, 6326 | | | | | 91051 | |
| 6338, 6339, 6340, 6341, 6342, 6343, 6344, 6345 | 1129 & 1154 | H6054 / 1157 & 1156 | 32/3, 32 | 199*198 | 1156*1157 | |
| 6348, 6349, 350, 6351, 6352 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6392 | | H7635 | 160000 | | | |
| 6394 | | 4435 | 75000 | | | |
| 6400, 6406 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6407 | 6006 | 6014 | | | | |
| 6409, 6442 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6410 | 4511 | 4411 | 4000 | | | |
| 6411 | 4516 | 7400 | 35000 | | 4505 (24V.) | |
| 6412 | 4015A | 4415A | 7000 | | | |
| 6416, 6418, 6478 | | Grote 90861-5 | 115 | | | |
| 6421, 6453 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6422, 6423 | | 4412 | 10000 | | | |
| 6430, 6457 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6431 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6434 | | 4413 | 1100 | | | |
| 6435, 6440 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6437, 6438 | | Grote 90861-5, 90971-5 | 115 | | | |

| Grote Lamp Number | 6-Volt | Fleet Standard 12-Volt | Heavy Candle Power | Service 12-Volt | Duty 12-Volt | Grote 24-Volt |
|---|---|---|---|---|---|---|
| 6439 | | 4570X | 3200 | | | |
| 6441 | | H7606 | 1000 | | | |
| 6443, 6445 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6444 | 4511 | 4411 | 4000 | | | |
| 6446 | | 4589 | 5000 | | | |
| 6447 | | 4537 | 200000 | | | |
| 6448, 6450 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6449 | | 4570 | 3200 | | | |
| 6454, 6455 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6456 | | H7006 | 1000 | | | |
| 6458 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6461, 6462 | | 886 | 95 | | | |
| 6463 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6474, 6475, 6476, 6477 | | Grote 90861-5, 90971-5 | 115 | | | |
| 6489 | | 4511 | 2300 | | | |
| 6492 | | 4589 | 5000 | | | |
| 6493 | 4511 | 4411 | 4000 | | | |
| 64941 | | 4413 | 1100 | | | |
| 64943 | | 4412A | 8800 | | | |
| 6499 | | H7606 | 1000 | | | |
| 7603 | | 67 | 4 | | | |
| 7604, 7605 | | 795 (Grote 90900) | 75000 | | | |
| 7608 | 1183 | 1295 | 50 | | | |
| 7616, 7618 | | 1295 | 50 | | | |
| 7620, 7622, 7624 | | 7400 | 35000 | | | |
| 7628 | | | | | 4505 (24V.) | |
| 7645 | | 795 (Grote 90900) | 75000 | | | |
| 7646, 7648, 7680 | | 795 (Grote 90900) | 75000 | | | |
| 7682, 7684 | | 795 (Grote 90900) | 75000 | | | |
| 7692, 7693 | | 795 (Grote 90900) | 75000 | | | |
| 7715 | | 795 (Grote 90900) | 75000 | | | |
| 7800, 7815 | 1129 | 1156 | 32 | | | |
| 7830 | 1129 | 1156 | 32 | 199 | 1156 | |
| 7832 | | 4636 | 90000 | | | |



# Canadian Motor Vehicle Safety Standards & Federal Motor Vehicle Safety Standards

## BASIC EQUIPMENT REQUIRED ON ALL TRUCKS, BUSSES & MPVs

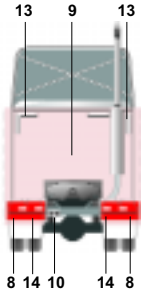
| DESCRIPTION | | | | MANDATORY REQUIREMENTS | | | |
|---|---|---|---|---|---|---|---|
| **Area** | **Equipment** | **SAE Lens Code** | **Function** | **Quantity** | **Color** | **Location** | **Height From Ground** |
| 1 | Headlamps - Lower Beam<br>US requires DOT lettering on lens<br>US & Canada - light source code required on lens | H, HR | Forward road illumination | Minimum 2 | White | On the front - Symmetrical<br>As far apart as practicable<br>If 4 lamp system - outboard or above upper beams | 560 - 1,370 mm<br>22-54 inches |
| | Headlamps - Upper Beam<br>US requires DOT lettering on lens<br>US & Canada - light source code required on lens | H, HR | Forward road illumination | Minimum 2 | White | On the front - Symmetrical<br>If 4 lamp system - inboard or below lower beams. | 560 - 1,370 mm<br>22-54 inches |
| | Parking Lamps § | P | Indicate parked vehicle | Minimum 2 | White or Yellow | On the front - Symmetrical<br>As far apart as practicable | 380 - 1,530 mm<br>15-60 inches |
| | Daytime Running Lamps (DRL)<br>Canada - Required<br>US - Optional (US requires "DRL" lettering on lens if not headlamp) | Y2 | Indicate in use vehicle | Minimum 2 | White or Yellow | On the front - Symmetrical<br>As far apart as practicable | 380 mm minimum<br>15 inches minimum<br>Max. depends on type of DRL |
| | Front Turn Signal / Hazard Warning Lamps | I | Indicate direction of turn/ identify disabled vehicle | Minimum 2 | Yellow | On the front - Symmetrical<br>As far apart as practicable | 380 - 2,110 mm<br>15 - 83 inches |
| 2 | Front Clearance Lamps† | P2, PC* or P3, PC2* | Show vehicle's width | Minimum 2 | Yellow | At widest point - symmetrical on the front or near the front facing forward | As high as practicable |
| 3 | Front Identification Lamps (ID)† | P2 or P3 | Indicate presence of a wide vehicle | Exactly 3 | Yellow | On the front - center horizontally spaced 150 mm (6 in) to 300 mm (12 in) apart | As high as practicable or on top of the cab |
| 4a | Front Side Marker Lamps | P2, PC*, P3, PC2* | Front and rear side marker lamps / side reflex reflector indicate vehicle's presence and length | Minimum 2 | Yellow | Each side at front as far forward as practicable | 380 mm minimum<br>15 inches minimum |
| 4b | Front Side Reflex Reflectors | A | | Minimum 2 | Yellow | At front - symmetrical as far forward as practicable facing sideward | 380 - 1,530 mm<br>15 - 60 inches |
| 5a | Rear Side Marker Lamps** | P2, PC* or P3, PC2* | | Minimum 2 | Red | Each side at rear as far back as practicable | 380 mm minimum<br>15 inches minimum |
| 5b | Rear Side Reflex Reflectors** | A | | Minimum 2 | Red | Each side at rear as far back as practicable facing sideward | 380-1,530 mm<br>15 - 60 inches |
| 6 | Rear Clearance Lamps** † | P2, PC* or P3, PC2* | Show vehicle's width, MAY NOT be combined with tail | Minimum 2 | Red | At widest point - symmetrical on the rear or near the rear facing rearward | As high as practicable<br>May be lower only if rear ID lamps are at the top |
| 7 | Rear Identification (ID) Lamps** † | P2 or P3 | Indicate presence of a wide vehicle | Exactly 3 | Red | On the rear - center<br>Horizontally spaced 150 mm (6 in) to 300 mm (12 in) apart facing rearward | **In Canada:** at the top - lower if door header narrower than 25 mm<br>**In USA:** as high as practicable |
| 8 | Tail Lamps | T | Indicate vehicle's presence and width | Minimum 2 | Red | On the rear - symmetrical<br>As far apart as practicable | 380 - 1,830 mm<br>15 - 72 inches |
| | Stop Lamps | S | Indicate braking | Minimum 2 | Red | On the rear - symmetrical<br>As far apart as practicable | 380 - 1,830 mm<br>15 - 72 inches |
| | Rear Turn Signal/<br>Hazard Warning Lamps | I | Indicate direction of turn / identify disabled vehicle | Minimum 2 | Red or yellow | On the rear - symmetrical<br>As far apart as practicable | 380 - 2,110 mm<br>15 - 83 inches |
| | Rear Reflex Reflectors | A | Show vehicle's presence and width | Minimum 2 | Red | On the rear - symmetrical<br>As far apart as practicable | 380 - 1,1530 mm<br>15 - 60 inches |
| 9 | Backup Lamp | R | Illuminates ground behind the vehicle and alert road users | Minimum 1 | White | Rear | No requirement |
| 10 | License Plate Lamp(s) | L | Illuminates license plate | Minimum 1 | White | On the rear - above or at the sides of license plate | No requirement |
| 11 | Center High Mounted Stop Lamp ‡ | U3 | Indicates braking | 1 | Red | On the rear - centerline of the vehicle | 860 mm minimum<br>34 inches minimum |

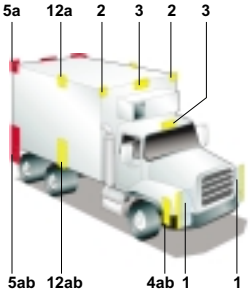
## ADDITIONAL EQUIPMENT FOR SPECIFIC VEHICLES - VEHICLES 9.1 m (30 ft.) LONG OR LONGER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12a | Intermediate Side Marker Lamps | P2 or P3 | Indicate presence of a long vehicle | Minimum 2 | Yellow | Each side near center | 380 mm minimum<br>15 inches minimum |
| 12b | Intermediate Side Reflex Reflectors | A | Indicate presence of a long vehicle | Minimum 2 | Yellow | Each side near center facing sideward | 380 - 1,1530 mm<br>15 - 60 inches |

## TRUCK TRACTORS

| DESCRIPTION | | MANDATORY REQUIREMENTS | | | | | |
|---|---|---|---|---|---|---|---|
| Area | Conspicuity Treatment | DOT Code | Quantity | Color | Location | Height | Options |
| 13 | Rear Upper Body Markings | DOT-C<br>DOT-C2<br>DOT-C3<br>DOT-C4 | Exactly 2 pairs of 300 mm long strips | White | Rear upper corners of cab facing rearward | As high as practicable excluding fairings | |
| 14 | Rear Marking | | Exactly 2 sections of min. 600 mm each | Red/White | Rear - facing rearward - on fenders, on mud flap brackets, or within 300 mm below the top of mud flaps | As horizontal as practicable and not higher than 1,525 mm from the | If mud flaps not used - on the cab or frame mounted brackets |



# Canadian Motor Vehicle Safety Standards & Federal Motor Vehicle Safety Standards

## BASIC EQUIPMENT REQUIRED ON ALL TRAILERS

| DESCRIPTION | | | | MANDATORY REQUIREMENTS | | | |
|---|---|---|---|---|---|---|---|
| Area | Equipment | SAE Lens Code | Function | Quantity | Color | Location | Height From the Ground |
| 1 | Tail Lamps | T | Indicate vehicle's presence and width | Minimum 2 | Red | On the rear - symmetrical as far apart as practicable | 380 - 1,830 mm 15 - 72 inches |
| | Stop Lamps | S | Indicate braking | Minimum 2 | Red | On the rear - symmetrical as far apart as practicable | 380 - 1,830 mm 15 - 72 inches |
| | Rear Turn Signal Lamps | I | Indicate direction of turn | Minimum 2 | Red or Yellow | On the rear - symmetrical as far apart as practicable | 380 - 2,110 mm 15 - 83 inches |
| | Rear Reflex Reflectors | A | Indicate vehicle's presence and width | Minimum 2 | Red | On the rear - symmetrical as far apart as practicable facing rearward | 380 - 1,530 mm 15 - 60 inches |
| 2 | License Plate Lamp(s) | L | Illuminates license plate | Minimum 1 | White | On the rear - above or at the sides of license plate | No requirement |
| 3 | Rear Side Marker Lamps | P2, PC* or P3, PC2* | Front and rear side marker lamps / side reflex reflectors indicate vehicle's presence and length | Minimum 2 | Red | Each side at rear as far back as practicable | 380 - 1,530 mm 15 - 60 inches no max. for veh. under 2,032 mm (80 inches) wide |
| | Rear Side Reflex Reflectors | A | | Minimum 2 | Red | Each side at rear as far back as practicable facing sideward | 380 - 1,530 mm 15 - 60 inches |
| 4a | Front Side Marker Lamps | P2, PC* or P3, PC2* | | Minimum 2 | Yellow | Each side at front as far forward as practicable | 380 mm minimum 15 inches minimum |
| 4b | Front Side Reflex Reflectors | A | | Minimum 2 | Yellow | Each side at front as far forward as practicable facing sideward | 380 - 1,530 mm 15 - 60 inches |
| **ADDITIONAL EQUIPMENT FOR TRAILERS EXCEEDING THE FOLLOWING PARAMETERS** | | | | | | | |
| **Length 9.1 m (30 ft) or longer** | | | | | | | |
| 5a | Intermediate Side Marker Lamps | P2 or P3 | Indicate presence of a long vehicle | Minimum 2 | Yellow | Each side near center facing sideward | 380 mm minimum 15 inches minimum |
| 5b | Intermediate Side Reflex Reflectors | A | Indicate presence of a long vehicle | Minimum 2 | Yellow | Each side near center facing sideward | 380 - 1,530 mm 15 - 60 inches |
| **Width 2,032 mm (80 inches) or wider** | | | | | | | |
| 6 | Rear Clearance Lamps | P2, PC* or P3, PC2* | Show vehicle's width MAY NOT be combined with tail | Minimum 2 | Red | At widest point - symmetrical on the rear or near the rear facing rearward | As high as practicable may be lower only if ID lamps are at the top |
| 7 | Rear Identification (ID) Lamps | P2 or P3 | Indicate presence of a wide vehicle | Exactly 3 | Red | On the rear - center horizontally spaced 150 mm (6 in) to 300 mm (12 in) apart facing rearward | **In Canada:** at the top - may be lower if door header narrower than 25 mm **In USA:** as high as practicable |
| 8 | Front Clearance Lamps | P2, PC* or P3, PC2* | Show vehicle's width | Minimum 2 | Yellow | At widest point - symmetrical on the front or near the front facing forward | As high as practicable |
| **Width 2,032 mm (80 inches) or wider AND GVWR 4,536 kg (10,000 lbs) or more** | | | | | | | |

| DESCRIPTION | | MANDATORY REQUIREMENTS | | | | | |
|---|---|---|---|---|---|---|---|
| Area | Conspicuity Treatment | DOT Code | Quantity | Color | Location | Height | Options |
| 9 | Rear Upper Body Markings | DOT-C DOT-C2 DOT-C3 DOT-C4 | Exactly 2 pairs of 300 mm long strips | White | On the rear upper corners facing rearward | At the top | Reflex reflectors may not be required if they are replaced in their required location with conspicuity treatment. **Optional in Canada:** Rear lower body and side conspicuity treatment may also be solid white, solid yellow, or white and yellow. |
| 10 | Bumper Bar Marking | | Continuous | Red/White | On the rear bumper bar's horizontal element full width - facing rearward | No requirement | |
| 11 | Rear Lower Body Marking | | Continuous | Red/White (See options) | On the rear full width of the vehicle facing rearward | As horizontal as practicable and as close as practicable to the range of 375 to 1,525 mm from the ground | |
| 12 | Side Marking | | See Location | Red/White (See options) | Each side - facing sideward continuous, or evenly spaced over minimum of 50% of length starts and ends as close to the front and rear of the vehicle as practicable | As horizontal as practicable and as close as practicable to the range of 375 to 1,525 mm from the ground | |

* Photometrically certified at installation angle

** Not required on truck tractors

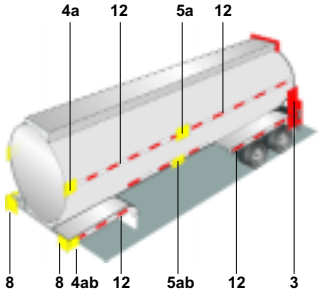
§ Vehicles less than 2,032 mm wide

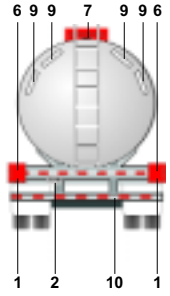
†Vehicles 2,032 mm wide or wider

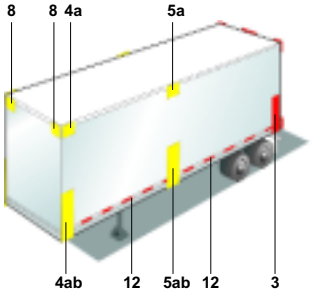
‡Vehicles less than 2,032 mm wide and 4,536 kg

**IMPORTANT NOTE:** Every lamp, reflex reflector, and conspicuity treatment must be permanently attached in the location specified and must comply with all applicable requirements prescribed for it by FMVSS/CMVSS 108. The face of any device on the front/rear and sides should be respectively perpendicular and parallel to the vehicle's centerline unless it is photometrically certified at installation angle. No part of the vehicle shall prevent any device from meeting its prescribed requirements unless an auxiliary device meeting all prescribed requirements is installed.

**IN CANADA:** Manufacturers and importers of vehicles must have the proper certification test records demonstrating compliance of lighting components with all prescribed requirements.



‡Vehicles less than 2,032 mm wide and 4,536 kg

# Trailer Wiring Data

## HOW TO SELECT SIZE OF ELECTRICAL CABLE

Wire is used to carry current from the battery through the vehicle to various electrical components: lights, instruments, etc.

In automotive use, the grounded return system is used almost exclusively. In this system, a single wire is run from the battery through switches to the load and the vehicle itself provides the ground or return to the battery.

It is important to note that all electric components have a good ground. In a combination of vehicles (tractor-trailer) it is important that a good and adequate size ground wire be provided between the two vehicles to carry the current.

Wire has certain resistance to current flow. The smaller the wire, the greater the resistance.

Also, as the amount of current (amps) increases, the resistance (ohms) increases.

For a 12-volt system there are two factors to be considered:

1) Voltage drop is the primary consideration in selecting the proper electrical wire size. The length of wire in a circuit is the major contributing factor to voltage drop.
2) The current carrying capacity of the wire. The heavy load in an undersize wire may increase the temperature of the PVC insulation above a safe level of 180° F.

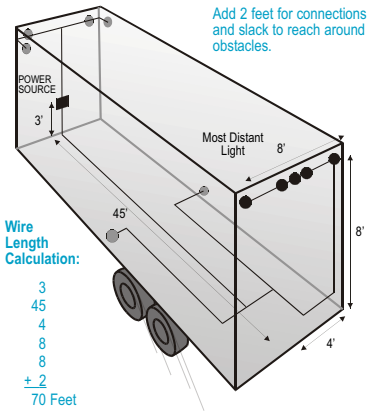
The Wire Size charts shown below are provided for easy selection of wire sizes. These charts, however, neglect losses due to connections or switches.

To use either of these charts:

a) Determine the total wire length from the power source to the most distant point in the circuit.
b) Determine the total electrical load on the circuit.
c) Find the load along one edge of the chart. (6v or 12v) depending on the vehicle voltage in question, taking the next higher load if the indicated load falls between two points on the chart.
d) Find the cable length required along the edge of the chart, taking the next higher length (if the exact length is not cited).
e) At the intersection of the length and load column, read the minimum size wire required for that particular circuit.

### *Example*

On a 12-volt system, operating at an ambient temperature of 125° F, determine the wire size required for a clearance light circuit having eleven lights using No. 97 bulbs.




a) Find the total ampere load in the circuit. There are 11 No. 97 bulbs. From the bulb chart on pages 50 and 51, you determine that each bulb is rated at 0.69 amps. The total load is 0.69 amps x 11 = 7.59 amps.
b) Find the distance from the power source to the most distant light. Total distance = 3 + 45 + 4 + 8 + 8 + 2 = 70 ft.
c) In the "Wire Size Chart" below, find the column with the "Length of Wire" that matches the example. Your most distant light is 70 ft. Next, find the row with the ampere load that matches the example. Hint: The next highest value above 7.59 amps is 8.0 amps. At the intersection of this row and column, you'll find a 12 gauge wire indicated. This is the correct wire size to use.
d) Check to see if it's safe to use a 12-gauge wire at an ambient temperature of 125° F. In the "Temperature Chart" below, find the temperature column that matches the example. Your ambient temperature is 125° F. Next, find the row with the wire gauge that matches the example. Your wire is 12 gauge. At the intersection of this row and column, you'll find that the current carrying capacity of a 12-gauge wire at 125° F is 32 amps. That's well in excess of your 8-amp load, so you're okay.

### *WIRE SIZE CHART*

| For A 12-Volt System | For A 6-Volt System | Length of Wire (Most Distant Light) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10' | 20' | 30' | 40' | 50' | 60' | 70' | 80' | 90' | 100' |
| Load in Amps | Load in Amps | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge | Wire Gauge |
| 1.0 | 0.5 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 1.5 | 0.75 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 2.0 | 1.0 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 16 | 16 | 16 |
| 3.0 | 1.5 | 18 | 18 | 18 | 18 | 18 | 16 | 16 | 16 | 14 | 14 |
| 4.0 | 2.0 | 18 | 18 | 18 | 16 | 16 | 16 | 14 | 14 | 14 | 12 |
| 5.0 | 2.5 | 18 | 18 | 18 | 16 | 14 | 14 | 14 | 12 | 12 | 12 |
| 6.0 | 3.0 | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 12 | 12 |
| 7.0 | 3.5 | 18 | 18 | 16 | 14 | 14 | 12 | 12 | 12 | 12 | 10 |
| 8.0 | 4.0 | 18 | 16 | 16 | 14 | 12 | 12 | 12 | 10 | 10 | 10 |
| 10.0 | 5.0 | 18 | 16 | 14 | 12 | 12 | 12 | 10 | 10 | 10 | 10 |
| 11.0 | 5.5 | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 10 | 10 | 8 |
| 12.0 | 6.0 | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 10 | 8 | 8 |
| 15.0 | 7.5 | 18 | 14 | 12 | 12 | 10 | 10 | 10 | 8 | 8 | 8 |
| 18.0 | 9.0 | 16 | 14 | 12 | 10 | 10 | 8 | 8 | 8 | 8 | 8 |
| 20.0 | 10.0 | 16 | 16 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 8 |

### *TEMPERATURE CHART*

| Cable Size | Maximum Current Carrying Capacity (For 12 Volts at Listed Temperatures) | | |
|---|---|---|---|
| | 120° F | 125° F | 150° F |
| 20 Gauge | 15 Amps | 13 Amps | 9 Amps |
| 18 Gauge | 18 Amps | 15 Amps | 11 Amps |
| 16 Gauge | 22 Amps | 19 Amps | 14 Amps |
| 14 Gauge | 27 Amps | 23 Amps | 17 Amps |
| 12 Gauge | 40 Amps | 32 Amps | 24 Amps |
| 10 Gauge | 50 Amps | 42 Amps | 31 Amps |

## "Grote Info .... What You Need To Know!"

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Grote Industries, Inc.
2600 Lanier Drive
Madison, Indiana
47250 USA
Tel: 812-273-1296
800-628-0809
800-457-9540
Fax: 812-265-8440
Email: safety@grote.com

Grote Industries Co.
393 Nugget Ave.
Toronto, Ontario
M1S 4G3 Canada
Tel: 416-291-8861
800-268-5612
Fax: 416-291-8135
800-267-9024
Email: canada@grote.com

Grote Industries de México,
S.A. DE C.V.
Av. Rogelio Gonzalez Caballero No. 225
Parque Industrial Stiva Aeropuerto
Apodaca, Nuevo León, México
CP 66600
Tel: 011-52-81-8386-4265
Fax: 011-52-81-8386-4269
Email: mexico@grote.com

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